

# START

0011687 96

DON'T SAY IT --- Write It!

DATE: October 16, 1990

TO: Doug Sherwood, EPA

FROM: Julie K. Erickson *JKE*

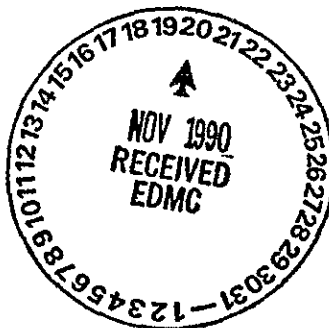
Telephone: 376-3603

cc: Administrative Record (200-BP-1 Operable Unit) *H4-22*

SUBJECT: 200-BP-1 SITE SAFETY PLANS

Enclosed are the currently available field safety and radiation work procedure documents that pertain to field activities at the 200-BP-1 Operable Unit. As additional documents become available, they will also be forwarded on to you, for use in preparing for field visits. We appreciate the invitation to accompany you on these field visits, and look forward to hearing from you soon.

Enclosures: KAISER SITE SAFETY PLAN  
GROUNDWATER MONITORING WELL INSTALLATION, 600 AREA



DOE - CCC: completes action # 5475 (I90-ERB-213)

Project Name: 200-BP-1 Operable Unit  
Job Description: Groundwater Monitoring Well Installation, 600 Area

Requested by: J. T. Lilly, KEH Environmental Restorations

Date: August 31, 1990

Rev. No. 0

APPROVALS - SIGNATURE

S. R. Turney

S. R. Turney, Author, Well Site Safety Supv.

9/6/90  
Date

J. T. Lilly

J. T. Lilly, Acting Manager  
KEH., Environmental Restoration Projects

9/6/90  
Date

W. H. Bodily

W. H. Bodily, Manager  
KEH., Environmental Compliance

9/6/90  
Date

T. H. Lovatt

T. H. Lovatt, Manager  
KEH., Industrial Safety and Health

9/6/90  
Date

D. G. Foust

D. G. Foust, Manager  
KEH., Radiation Protection

9/6/90  
Date

Accepted By:

B. A. Gilkeson

B. A. Gilkeson, Project Engineer  
WHC., Waste Management & Environmental Projects

9/6/90  
Date

W. H. Price

W. H. Price, Manager  
WHC., Environmental Field Services

9/6/90  
Date

J. R. Bell

J. R. Bell, Manager  
WHC., Industrial Safety & Fire Protection

9/6/90  
Date

R. A. Carlson

R. A. Carlson, Tech. Coordinator  
Environmental Engineering

9-6-90  
Date

J. M. Larcis

Manager, WHC Health Physics

9/6/90  
Date

1. Introduction:

The intent of this document, Site Specific Safety Plan (SSSP), is to define site specific parameters for installation of the 200-BP-1 Operable Unit groundwater monitoring wells within the 600 Area. The objective of the monitoring program is to provide a definable means of assessing the present and future status of groundwater contamination. The SSSP, as revised, encompasses information gleaned from historical reviews, current environmental programs/monitoring information and site characterization studies. By collating this data, prescribed execution of site preparation, well drilling, sub-surface characterization, inspection, monitoring, completion and development activities, testing and handling of well equipment and waste products can be defined.

2. Project Description:

This project consists of the completion of six groundwater monitoring wells in support of the 200-BP-1 Operable Unit Remedial Investigation. This work constitutes part of Task 6 of the 200-BP-1 Operable Unit Work Plan (DOE-RL 88-32, Rev. 1). Four of the six wells have been previously drilled and cased to the top of basalt by KEH under hazardous waste site status. Wells 699-49-57(B), 699-50-53(B) are to be extended to the first confined aquifer and subsequently completed. Wells 699-48-50 and 699-52-54 are at total depth and are to be completed. Wells 699-52-57, 699-55-55 have not been started and are scheduled to be drilled, sampled and subsequently completed. After re-evaluation, it has been determined this work can be finished under a non-hazardous waste site status rather than the previous hazardous waste site classification. The following justifies this position:

1. Four of the six wells are cased to top of basalt through the unconfined aquifer. All six are a considerable distance outside the 200-BP-1 boundary.
2. Monitoring data from the initial work has not indicated chemical contamination in levels of a health concern. Observations relative to field instrument readings have not been substantiated as positive readings to date.
3. Radioisotopic analysis of water from 699-50-53(B) indicated negligible contamination. Re-evaluation by Health Physics confirms no Radiation Work Permit is required for this work.
4. Wells 699-52-57 and 699-55-55 are wells to be sampled for the purpose of obtaining background concentrations of parameters of interest for comparison with samples from within the 200-BP-1 Operable Unit boundary.
5. Reconnaissance of these sites has shown them to be previously undisturbed without contamination deposited on the surface. Although groundwater monitoring data shows low level radiological and chemical contamination

plumes, it is not credible to expect associated health risks considering the four wells are cased into rock through the unconfined aquifer and the remaining two are background wells.

Taking into account all of the above information, it was determined the Hazardous Waste Operations Permit format should be used under the title "Site Specific Safety Plan." This will allow contingencies to be built in to upgrade a well to hazardous waste site status should contamination be encountered. Conducting this work under non-hazardous waste site status will not detract from worker safety and health. Adequate safety and health controls are implemented in the SSSP and will be followed as stated.

If contamination is encountered during these work activities, the affected drill site will be elevated to hazardous waste site status and applicable 200-BP-1 RI/FS Work Plan HASP requirements shall be imposed.

### 3. Location:

This Operable Unit is located in the approximate center of the Hanford Site, along the northern boundary of the 200-East area.

Maps showing the location of the 200-BP-1 Operable Unit and associated plumes are attached.

### 4. Facility/Work Site Description:

The Operable Unit includes nine inactive cribs (216-BY-43 thru 50 and 57) that received waste from U-Plant Uranium reclamation operations and waste storage tank condensate from the 241-BY Tank Farm, and one inactive crib (216-B-61) that was never used, as well as sites of three unplanned releases that were the result of tank farm operations. All but two of the cribs have been inactive since the mid-1950's. The remaining two were operated into the early 1970's.

The well site locations are primarily typical Hanford desert terrain. Well site locations have been graded and cleared of vegetation.

Cable tool drilling rigs will be used to conduct the drilling. It is anticipated that two or possibly three rigs will be in operation simultaneously. Each well will be completed to groundwater with stainless steel screen per the 200-BP-1 RI/FS Work Plan.

5. Proposed Personnel and Job Functions:

Superintendent: J. Curl

Field Team Leader: J. A. Bultena (Drilling)  
D. C. Weekes (Borehole Completion)

Project Engineer: B. A. Gilkeson

<u>Proposed Field Team</u>	<u>Job Function</u>
D. L. Wright	Site Safety Officer
To be determined by KEH	Drillers
To be determined by KEH	Craft Manpower *
L. D. Walker/ <sup>George Kelly</sup> <del>K. M. Singleton</del>	Geologists
W. S. Thompson/J. W. Roberts/S. M. Loftus	Sampling Scientists
Radiation Protection Pool <del>Terry (Fenchie)</del>	HPT
C. S. McClellan/S. M. Steele/R. Z. Staffla	Sampling Technicians
Support Personnel as needed	Ind. Hyg., Crafts, QA, etc.
T. W. Spicer	FTL (alternate)

\* Craft manpower, number of individuals, assigned to drill rig operation will be determined by the superintendent based upon task complexity and safety considerations. More complex tasks may require additional personnel assigned to drill rig operation for the period of time the task is being performed. Further, when a drill rig is located in an isolated location, additional craft may be assigned to drilling operations for safety considerations.

6. Confined Space Entry

Will this task require entry into any confined or partially confined space?

Yes/No

7. Cutting and Welding

Will this task involve use of a cutting torch or welding? Yes/No

Cutting and welding associated with the borehole casing is necessary.  
Permits will be in place before welding.

8. Other Potential Hazards:

- |   |                           |   |                             |
|---|---------------------------|---|-----------------------------|
| X | Chemical                  | X | Trips, Slips, Falls         |
| X | Radiological              |   | Trenching/Shoring           |
| X | Fire/Explosion            |   | Unstable/Uneven Terrain     |
| X | Heat Stress               | X | Overhead Hazards            |
| X | Electrical                | X | Machinery/Mechanical Equip. |
|   | Heavy Equipment/Vehicular |   | Noise                       |
|   | Traffic                   | X | Other - Describe below      |

See attached "Job Safety Analysis" (JSA) for a description of work activities, hazards, and safety measures as they relate to fire/explosions, electrical hazards, machinery/mechanical equipment, trips/falls/slips, overhead hazards and other pertinent site hazard information.

Although discussed in the JSA, the hazard classification listed below requires emphasis and further explanation.

Chemical - A list of chemicals known to have been discharged to the 200-BP-1 Crib in order of greatest amount released to least amount released includes: Sodium, Nitrate, Sulfate, Phosphate, Ferrocyanide, Ammonium Nitrate, Ammonium carbonate. Also Tributyl phosphate and paraffin hydrocarbon, are suspected to have been released to the cribs. Additional chemical contaminants have been found to exist in the groundwater beneath the operable unit. This list includes those mentioned above plus cyanide, ammonium, chloride, fluoride, potassium, magnesium, barium, vanadium, selenium, arsenic, zinc, copper, mercury, and chromium.

Radiological - WHC has characterized these wells as a LOW potential hazard and no RWP is required. Although the potential exists for radiological exposure, drilling activity at the four partially completed wells has shown no radiological contamination to be present in the boreholes. See attached supplement information for Radiological characterization of the 200-BP-1 Operational Unit and the hazard rating system.

Heat Stress - It has been determined by KEH that routine drilling of groundwater monitoring wells in level D protective equipment is classified as a light to moderate workload. This is based on individuals who have been acclimated to Hanford's summer months, have sufficient intake of cool water, and applied engineering controls. If temperatures at the site are above 80°F, site personnel shall be assessed for heat stress by monitoring wet

globe/bulb temperature (WGBT). In the event that work/rest periods are warranted, the SSO will follow the prescribed regimes of the ACGIH in the current TLV booklet. Sufficient cool water and disposable drinking cups will be provided in the support zone. Engineering controls such as solar shielding will also be applied when and where appropriate.

Noise - Noise poses a serious health and safety hazard during the installation of wells, particularly during the driving of casing and certain back-pulling techniques. The control/exclusion zone will be labeled as "Hearing Protection Required when Equipment is Operating" with protective devices supplied onsite. Hearing protection will be worn when equipment is running or drilling is in progress.

Other - Other physical hazards that may be associated with warm weather conditions include Rattlesnakes, Scorpions, Brown Recluse, and Black Widow spiders. All are indigenous to this area and may be found throughout the reservation. Because these creatures favor obscured places, personnel should be alert when working near cool and shaded areas. Packaged materials, stored clothing, steel casing, etc. also provide favorable "hiding" places.

Field crews should also be aware of thunder and lightning storms. Such storms may be accompanied by very high winds. These conditions must be evaluated and, if necessary, work activity will cease until the hazard has abated.

#### 9. Chemical/Radiological Hazard Evaluation:

<u>Waste Media</u>		<u>Hazardous Characteristics</u>	
X	Airborne Contamination		Ignitable
	Surface Contamination		Corrosive
X	Contaminated Soil	-	Reactive
X	Contaminated Groundwater		Explosive
	Contaminated Surface Water	X	Toxic (non-radiological)
	Solid Waste	X	Radioactive
	Liquid Waste		
	Sludge		

Although there were a number of chemical contaminants discharged into the 200-BP-1 cribs, it is believed that those pose little or negligible health hazard to personnel involved in the work effort. This is primarily due to the distance these sites are located from the crib area, the configuration of the four partially completed wells, onsite observations and collected monitoring data associated with these four wells. The following chemical agents presented within the Remedial Investigation/Feasibility Study (RI/FS), groundwater monitoring data, and historical accounts are as follows:

- . Cyanide Compounds - This is the agent of greatest concern and due to the complex waste stream and radiolysis, the cyanide group may take many forms. Cyanide salts, hydrogen cyanide, ferric ferrocyanide, and free cyanide are all possible forms.
- . Cyanide, CN, is readily absorbed from all routes, including skin, mucous membrane, and by inhalation, although cyanide alkali salts (KCN, NaCN, Ca(CN)<sub>2</sub>) are toxic only when ingested. Cyanide poisoning is reported to produce a bitter almond odor on the breath with a low and high odor threshold of 0.5 and 3.5 ppm, as Hydrogen Cyanide, respectively. Typically, cyanide has a bitter, burning taste, followed by increased salivation, and upper respirator irritation leading to more clinical symptoms of poisoning. In humid atmospheres, nasal irritation and skin dermatitis have been reported. Skin contact can cause itching, discoloration, or corrosion, most likely due to alkalinity of the solution. OSHA has set the PEL at 5 mg/m<sup>3</sup>.
- . Hydrogen Cyanide, HCN, formed by the reaction of ferric ferrocyanide with the dilute nitric acid during waste treatment. The solution is weakly acidic, soluble in water, and presents generally the same characteristic, odor sensation and symptomatology as cyanide. The toxicological manifestation is due to metabolic asphyxiation. The PEL and TLV is 10 ppm and denoted as a ceiling limit. Hydrogen Cyanide is listed as a skin hazard, and OSHA has promulgated a Short Term Exposure Level (STEL) of 4.7 ppm and 5.0 mg/m<sup>3</sup> in their Final Rule.
- . Ferric Ferrocyanide, Fe<sub>4</sub>(Fe(CN)<sub>6</sub>)<sub>3</sub>, an inorganic salt, which is insoluble in water and dilute acids. Ferrocyanide does not readily release cyanide, but may be affixed to large particulates and become suspended during drilling operations. Not expected to be a contact problem unless moist soil or water is encountered and irritating to the eyes. No occupational exposure limits are established by OSHA, ACGIH, nor NIOSH, degradation product are regulated as CN salts or HCN.
- . Ammonia, NH<sub>3</sub>, is a colorless gas and can cause severe irritation of mucous membranes, eyes, respiratory tract, and skin. The low and high odor threshold is less than 0.5 to 60 ppm respectively, and characterized by a penetrating, pungent, suffocation odor. Given these odor and irritant properties of ammonia, workers will be forced to evacuate the immediate area before acute toxicity levels are encountered. OSHA no longer regulates ammonia by an 8-hour time weighted average, but has opted to use only the STEL of 35 ppm. TLV-TWA will be used to control workers long-term exposures, they are 25 ppm.



- . Tributyl Phosphate,  $(C_4H_9)_3PO_4$ , TBP is a colorless, odorless liquid which is an irritant to the eyes, mucous membranes of the respiratory tract and skin. Soluble in water and has an extremely low volatility. It has no known odor threshold. The PEL is 0.2 ppm.
- . Dibutyl Phosphate,  $(C_4H_9)_2PO_4$ , a colorless-to-brown, odorless liquid, used as an organic catalyst or antifoaming agent. It is an irritant to eyes and respiratory mucous membranes, similar to TBP, and expected to be irritating to the skin. Since it is a derivative of a phosphate salt, it is not expected to be an inhalation hazard unless large quantities of dust is generated. More importantly are the skin and splash hazards from hand-tooling and from groundwater intrusion. The PEL and TLV are similar being 1 ppm.
- . Petroleum Distillates, consist of paraffin hydrocarbons, i.e. hydrocarbons of the methane series. Examples include gasoline, naphtha, etc.; specific to 200-BP-1 is kerosene. Kerosene has been speculated as being present in the groundwater. If so, kerosene has a PEL/TLV of 100 ppm.

Heavy Metals and other anions have been identified in the groundwater; some near drinking water standards, Maximum Contaminant Level (MCL). They include iron, lead, arsenic, mercury, manganese, vanadium, zinc, chromium, barium, selenium, copper, and fluoride. Although present, these agents are homogenous and don't appear to be in dangerous quantities that may require special controls.

#### 10. Ambient Air/Site Monitoring Procedures

A series of monitoring campaigns will be employed to characterize borehole emissions and employee exposure profiles. The following warning and action levels are based on breathing zone data and not borehole concentrations. Although borehole conditions will be closely followed and findings conveyed to team members, it does not warrant stop work authority. At a minimum, this shall include the following:

- . Cyanide, as Hydrogen Cyanide (HCN) - Colorimetric tubes will be used to identify levels of Cyanide. The frequency of monitoring shall be conducted on an AM/PM basis, preferably after breaks when the well has been capped. As the hole progresses to the water table or perched water, the frequency of monitoring shall be assessed and increased to correspond with sample collection and drilling depth increments. Close coordination with the driller, geologist, and other key personnel will help to establish a sampling regime that will protect the health and safety of those involved.

Based on monitoring results, monitoring may be forgone during the construction and development phases. If any detectable or sensed reaction to cyanide is observed, the SSO will attempt to quantitatively identify the concentration; notify site personnel of the conditions; and observe and analyze the breathing zone and borehole more frequently until conditions subside. A warning level of 2 ppm will constitute an immediate review of protective controls and introduce repetitive colorimetric monitoring until levels drop. An action level of a twice repeated 4 ppm will require a level 8 up-grade, as well as the provisions stated for warning level.

- . Colorimetric tubes will also be used to monitor ammonia. Frequency will follow that of hydrogen cyanide monitoring with responses following the prescribed action above. Warning and action levels are 10 and 20 ppm, respectively. Controls will be implemented accordingly.
- . Organics: To monitor organic constituents, an organic analyzer operating in the PID mode will be used. Sampling will be conducted in the borehole and breathing zone, as well as on well cuttings and samples.
- . Radiation: WHC Environmental Health Physics has assigned intermittent monitoring on an AM/PM basis and the HPT shall remain cognizant of onsite conditions.

The following instruments shall be used to monitor the work environment and workers' breathing zones.

	<u>Instrument</u>	<u>Monitoring Frequency</u>				
X	PID (HNU, OVM) w/10.6 eV lamp	Cont.	15 min.	30 min.	hourly	other
	OVA (optional)	Cont.	15 min.	30 min.	hourly	other
X	Combustible Gas Indicator	Cont.	15 min.	30 min.	hourly	other
	HCN Detector (optional)	Cont.	15 min.	30 min.	hourly	other
X	Colorimetric Detector	Cont.	15 min.	30 min.	hourly	other
	Tubes (list type of tubes below)					
X	pH Paper	Cont.	15 min.	30 min.	hourly	other

Other:

- . OVM Monitoring will be every two hours and conducted on all samples leaving the control zone. Before daily drilling operations can begin, the borehole must be monitored. Monitoring will also be conducted following breaks, lunch, etc. If readings are noted, continuous monitoring will be done until levels fall to background or until action level is reached.
- . Combustible Gas Indicator - Check borehole prior to welding, cutting or any other spark producing activity.
- . pH - Check pH periodically when hard tooling, reaching perched or purged water or a change in lithology.
- . HCN - Check cuttings and borehole with drager tubes at major lithology changes and when encountering aquifers.
- . Ammonia - Same sampling criteria as HCN.

Note: Instruments that are identified as "optional" may be incorporated into the monitoring regime as needed.

11. Personal Monitoring

Will be requested as needed from HEHF.

12. Biological Monitoring/Medical Surveillance

Biological monitoring is not necessary. Site personnel will have HEHF or equivalent medical surveillance.

13. Action Levels

<u>Instrument</u>	<u>Action Level</u>	<u>Specific Action</u>
OVM w/10.6 eV	5 ppm (breathing zone) above background for 3 minutes.	Dictates immediate zone evacuation. Prior to re- entry, engineering and administrative controls shall be reviewed to determine applicability before personnel are instructed to don level "B" protection. Concurrently, SSO will initiate measure to identify substance(s).

Note: The "Warning Level" is any reading greater than 3 parts per million (>3ppm) above background and demands immediate evaluation of all activities and the level of PPE. Requires continuous monitoring until levels return to background or the agent identified and potential exposures assessed.

Drager Tubes HCN NH <sub>3</sub>	Positive indication of 4 ppm of HCN or 20 ppm NH <sub>3</sub> on drager tubes in the borehole, on cuttings or in breathing zone.	Fall back, upwind of borehole, cease operations. Take borehole sample for laboratory analysis. Action levels of HCN and NH <sub>3</sub> will require an upgrade to Hazardous Waste Site status and a higher level of PPE.
--	---	---

Note: An indication/colorimetric change of 2 ppm (HCN) or 10 ppm NH<sub>3</sub> on Drager Tubes "warning level", requires immediate zone evacuation and evaluation of monitoring results.

Combustible Gas Detector	10% LEL	Prohibit welding, cutting or any spark producing activity within 10 feet of the borehole until levels fall below 10% LEL. Take measures to identify substance.
pH	pH4 and 10	Re-evaluation of site status, additional controls, and protective equipment.

Any readings above background on sample materials will require notification of laboratory personnel.

#### 14. ONSITE CONTROL

Site control will be established by a physical barrier (chain, fence, rope, hazard tape, etc.) and clearly marked with placards and/or signs. To control the flow of personnel and equipment, a well defined entry/exit will be established at the periphery of the zone. Whenever possible, the entry/exit should be located upwind of the drilling operations. The prevailing wind direction will be used as a guide for establishing zone access.

When feasible, the minimum prescribed area for a control/exclusion zone will measure fifty feet in all directions from the intended borehole. Note: zone parameters may not extend into an adjacent roadway nor beyond existing barriers. When adjacent to a roadway, physical barricades and flashers will

be used to mark the boundary of the control/exclusion zone. As a supplement, "Men Working" signs will also be placed 100 feet in advance of boundary corners.

A wind direction indicator, wind sock or similar device shall be erected at each well site. Where several sites are grouped together, one device may service the group. The wind direction indicator must be placed in clear view, unrestricted and away from buildings, or other structures that could influence its direction. The wind direction indicator, along with available historical data, and past experience will be used to define the prevailing wind direction. Where a command post and support facilities are utilized, they are to be located upwind.

A zone upgrade will occur when well specifications or unforeseen conditions change, i.e. air quality, water quality, radiation, etc. Collected data and other documentation will be evaluated by the SSO and other key personnel. If findings support an upgrade, the site will be reclassified and the level of PPE, monitoring, decontamination, and other parameters modified to accommodate site conditions.

The control/exclusion zone will remain in force through the drilling and construction phases, but may be removed when the well has been sealed with grout, casing capped, and all potentially hazardous materials and wastes from the drilling operations have been removed or contained. If contamination is verified and persists throughout the drilling and construction phases, site control measures will remain in force during well development. Under certain conditions, it may be acceptable to reduce the size of the zone and use the guard posts of the well to establish the new area. Placing a rope and signs warning personnel of suspected contamination will satisfy the requirement of demarcation.

Control Zone - A control zone is an administratively protected area characterized by available documentation and support data as having negligible, minimal or reduced risk potential to site personnel. To maintain site control and job continuity a control zone will follow the same guidelines and format as if operating in an exclusion zone. However, a control zone is characterized as non-hazardous and does not require a decontamination zone. Proper personal hygiene practices will be followed. Level "D" personal protective equipment will be used to promote personal hygiene and offer a margin of safety in the event that contaminants are detected.

Exclusion Zone - The exclusion zone is defined as a work area where the potential of encountering chemical and physical hazards is known or suspected to be present. When this classification is assigned, it is mandatory that personnel and equipment decontamination facilities be present. This may

also include a contamination reduction zone (CRZ), which is a buffer area between the exclusion zone and the support zone. To reduce the probability of support zone contamination, all decontamination procedures are to be conducted in a designated area.

Buddy System - The "Buddy System" concept is required on all well-drilling sites, and is established to provide emergency assistance to site personnel when working in a control or exclusion zone. By team members over-seeing one another, potential hazards, accidents and serious injury may be avoided. Circumvention is maintained through a direct line of sight and verbal/non-verbal communications. Close communication between personnel is necessary to assure that this concept is working at all times. A team consists of two or more individuals and can change as work efforts or responsibilities warrant.

Note: If one member of a team of two is required to leave the drill site, all operations will shut down until the team member or another "Buddy" returns.

Communication - A minimum of one radio, capable of two-way conversations, is required at each well-drilling site. Should communications fail, site personnel are required "TO STOP" all work activity and leave the control/exclusion zone until communications are restored.

When drilling operations are performed during "off hours", site personnel must have radio contact with an individual having immediate access to telephone communications.

J. A. Bultena, T. W. Spicer and the KEH SSO have been designated to coordinate access control on the work site during drilling. D. C. Weekes and the KEH SSO have been designated to coordinate access control on the work site during borehole completion activity.

List the specific protective equipment and material (where applicable) for each of the Levels of Protection identified above:

15. Personal Protective Equipment:

SHOULD UPGRADE OF SITE STATUS BE NECESSARY, AND CONDITIONS WARRANT, THE FOLLOWING SHALL BE WORN:

Level B

- X Pressure demand airline
- Pressure demand airline with escape provisions
- Pressure demand SCBA
- X Full Body Saranex Coveralls

Level C

- Half face Air Purifying Respirator
- Full face Air Purifying Respirator
- Full face canister Air Purifying Respirator

Level D

Hard hat  
Safety glasses with side shields  
Steel-toed boots (while in control/exclusion zone)  
Chemical resistant neoprene gloves (moist conditions)  
Long sleeve coveralls  
Splash protection as necessary  
Inner surgical glove (moist conditions)  
Hearing protection  
Leather gloves

Where air purifying respirators are authorized, HEPA filters (for silica) are the appropriate canisters/cartridges for use with the specific substances and concentrations anticipated.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE KNOWLEDGE AND APPROVAL OF THE KEH HEALTH AND SAFETY OFFICER. THE WHC SAFETY WILL ALSO BE CONSULTED ON ANY CHANGE.

16. Decontamination:

See "Typical Decontamination Procedures" Appendix A.

Note: Regardless of site status, good hygiene practices will be followed by all team members working in the controlled/exclusion zone, i.e., wash hands, face, and other soiled body parts prior to eating, drinking, smoking, or chewing, and at days end. Avoid any hand to mouth contact. No eating, drinking, chewing, or smoking inside the controlled/exclusion zone. Remove coveralls prior to eating. Coveralls must be changed daily or when they become obviously soiled.

Non-Hazardous Waste Site - The following outline can be used as a guide to sanitize equipment and instrumentation:

- . Instruments and other sampling equipment shall be wiped free of dust and other residue before removal from zone;
- . Unless access is imperative, support equipment (fuel truck, grease truck, propane truck, flat bed truck, etc.) are to remain on the outside of the control zone. Contact of service hose and other attachments with the ground should be kept to a minimum. However, if ground contact is made, cleaning is not required; and
- . No special controls are required for rig removal. However, personnel will take all necessary measures to assure that rig

contaminants (grease, oil, etc.) captured on plastic under the rig are not spread to unprotected areas of the control zone.

Hazardous Waste Site - Equipment that is to be removed from the exclusion zone will need to be decontaminated onsite or transported to an assigned location for such activity. An HPT will survey heavy equipment prior to movement and the SSO will ensure that preliminary on-site decontamination is performed prior to relocation outside the zone. This shall include the wiping down or washing of high contact areas, i.e. work platform and controls, and collecting the debris on plastic to be disposed of accordingly. Instrumentation or samplers taken into the exclusion area shall be left in the zone or follow the exit decontamination procedures. Access of support

vehicles, such as gas truck and radiological gamma logging truck must be limited to outside the exclusion zone when possible.

The following decontamination equipment is required:

- . Tubs, craft paper, visqueen
- . Brushes, bags
- . Non-phosphate soap
- . Potable water
- . Pump/hose
- . Wipes/towels

Emergency decontamination procedures:

Personnel injury takes precedence over decontamination. If the injury would be further aggravated, decontamination should not be attempted.

## 17. Environmental Protection and Response

At each well site, the area occupied by the drill rig will be covered with a heavy mil plastic or an equivalent to prevent soil contamination. Frequent inspections will be conducted under and around equipment to identify leaks. When large leaks are observed, the equipment will be shut down until the necessary repairs are made.

Where contamination of earth or liquid is suspected or known, all tainted material will be placed on impermeable plastic or containerized until the extent of contamination is determined, and/or disposal of this material is specified by WHC Environmental Safety and concurred by KEH Environmental Restoration and Environmental Compliance. Potential contaminants from the well include purge water, and spoils. Contaminants from drilling equipment include lubricating grease, oil, anti-freeze and gasoline. Substantial spills of contaminated or hazardous material may require response by the Hanford Fire Department Haz-Mat, (Emergency Response Team).



All materials that are produced from well drilling activities (cuttings, spoils, fluids, etc.) shall be periodically monitored with field instrumentation for volatile organics, radiological, and other constituents known to be associated with well installation. Containment, preferably in a 55-gallon drums, shall occur if any of the following conditions are present:

- (1) field instruments detect and confirm radiological or chemical contamination in the borehole or spoils;
- (2) encountering perched or ground water, moist or saturated soil;
- (3) pH values less than 4 or greater than 10 units; or
- (4) when spoils are being removed that contain known chemical, radiological, or mixed wastes, regardless of indication from field instruments. Suspected contaminants that may be encountered and contained, will be addressed in the SSSP.

To preclude the drumming of non-hazardous materials, the following conditions should be evaluated to determine if the source of contamination is actually from the borehole. Monitoring for fugitive or operational emissions, checking instrument sensitivity, confirming the presence of lubricants, checking for residual on casing/equipment from prior wells, and other site-to-site specifics. When the cumulative data shows that the source is the well, a decision will be rendered to following drumming procedures. This decision will be periodically reviewed to reverify or terminate the need to continue such practices.

Purge waters collected by the pump truck during well development, will be disposed of at specially constructed settling ponds, i.e. Mod-u-tank.

18. Confined Space Entry Procedures     X     Not Applicable

Yes N/A

<input type="checkbox"/> <input type="checkbox"/> Provide Forced Ventilation	<input type="checkbox"/> <input type="checkbox"/> Refer to Personal Protective Equipment
<input type="checkbox"/> <input type="checkbox"/> Test Atmosphere for:	<input type="checkbox"/> <input type="checkbox"/> Refer to Emergency Procedures
<input type="checkbox"/> <input type="checkbox"/> (a) % O <sub>2</sub>	<input type="checkbox"/> <input type="checkbox"/> Other Special Procedures
<input type="checkbox"/> <input type="checkbox"/> (b) % LEL	
<input type="checkbox"/> <input type="checkbox"/> (c) Other	

Descriptions/Other:

19. Cutting/Welding Procedure

Yes N/A

☒ Relocate or Protect Combustibles

☐ ☒ Wet Down or Cover Combustible Floor

☒ Check Flammable Gas Concentrations (% LEL) in air

☐ ☒ Cover Wall, Floor, Duct and Tank Openings

☒ Provide Fire Extinguisher 10 lb. ABC

Other Special Instructions:

Provide fire watch and follow provisions of welding and cutting permit.  
Welder to wear welding hood and leathers.

20. Radiological Conditions - NO RWP IS REQUIRED FOR THIS WORK

Contamination Potentials  
(Rate-neg, low, med, high, ext)

Exposure Rates Expected Average/Maximum:

☐ Alpha ☐ Beta ☐ Gamma ☐ Beta ☐ Gamma ☐  
Neutron

Smearability/Fixed:

Whole Body/Extremity:

21. Health Physics Technologist Coverage:

☐ None ☒ Intermittent ☐ Continuous ☐ See RWP No. ☐

HPT Coverage Required When: Courtesy check twice per day by HPT.

HPT Coverage Required Until:

Authorized Health  
Physics Technicians: HPT Pool

22. Personal Protective Equipment for Radiological Hazards:

☐ See RWP No. N/A

23. Radiation Dosimetry External:

<input type="checkbox"/> Basic TLD	<input checked="" type="checkbox"/> HMPD	Known or Suspected Isotopes:
<input type="checkbox"/> Pencil	<input type="checkbox"/> Finger Ring	
<input type="checkbox"/> PADI	<input type="checkbox"/> Timekeeping	
<input type="checkbox"/> Other		

Comments: \_\_\_\_\_

24. Radiation Monitoring:

The following instruments shall be used to monitor the work environment for radiation.

<input type="checkbox"/> Micro R Meter	Cont.	15 min.	30 min.	hourly	other	_____
<input type="checkbox"/> Dose Rate Instrument	Cont.	15 min.	30 min.	hourly	other	_____
<input type="checkbox"/> Alpha Detection Instrument	Cont.	15 min.	30 min.	hourly	other	_____
<input type="checkbox"/> Beta Detection Instrument	Cont.	15 min.	30 min.	hourly	other	_____
<input checked="" type="checkbox"/> Other:	Cont.	15 min.	30 min.	hourly	other	<u>see</u> <u>below</u>

Per Health Physics

25. Onsite Organization and Coordination: To be completed on site.

Project Coordinator: R. A. Carlson - WHC  
Field Team Leader: J. A. Bultena (Drilling), D. C. Weekes (Borehole Completion - WHC)  
Site Safety Officer: D. L. Wright - KEH  
Project Engineer: B. A. Gilkeson - WHC

Designated Health Physics Technician: HPT Pool

Alternate Health Physics Technician: HPT Pool

Work Team:

Name

Job Function

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

26. Training/Special Requirements:

See "Training, Education, and Zone Entry Requirements". Appendix "B". As a minimum, all employees and visitors must satisfy KEH training requirements. Appendix "B" also includes WHC established training requirements. These requirements as listed fulfill guidelines set by KEH and 29 CFR 1910.120.

27. Sanitation Requirements:

Potable water supply available on work site:

X Yes

Portable toilets required on work site?

X Yes

If yes,  
how many? 1

Temporary washing/shower facilities required  
at work site?

X Yes

If yes,  
describe  
below.

Description: Water for hand washing will be available at each site. Pressurized spray (eye) wash units will also be available.

28. Emergency Procedures

Yes

No

X

On-site Communications Required? KEH Health & Safety Emergency Channel J-44, J-10, or Emergency Cellular phone number 373-3800, WHC Emergency Channel: Station I, Transportation.

Nearest Telephone EFS Pipeyard or cellular phone in vehicle if available.

Fire and Explosion

In the event of a fire or explosion, take immediate action if the situation can be readily controlled with available resources without jeopardizing the health and safety of site personnel and the public.

If the situation cannot be readily controlled:

1. Notify emergency personnel by calling 811, J-44 or J-10 by KEH plant radio, or Emergency Cellular phone number 373-3800, WHC Emergency Channel: Station I, Transportation.
2. If possible, isolate the fire to prevent spreading.
3. Evacuate the area.

NOTE: No matter how minor, all injuries must be reported and the individual taken to the nearest HEHF First Aid Station.

Designated Personnel Current in First Aid/CPR (Names)

Name	Function
<u>T. W. Spicer J. Jimenez</u>	<u>FTL (alt)</u>
<u>J. A. Bultena</u>	<u>FTL</u>
<u>D. L. Wright</u>	<u>SSO</u>
Designated Back-Up Personnel	
<u>S. R. Turney</u>	<u>SSO Supervisor</u>

Emergency Response Authority

KEH Safety S. R. Turney and D. L. Wright are the designated Site Emergency Coordinators and have final authority for first response to on-site emergency situations.

Upon arrival of the appropriate emergency response personnel, the Site Emergency Coordinator shall defer all authority but shall remain on the scene if necessary to provide any and all possible assistance. At the earliest opportunity, the Site Safety Officer or the Site Emergency Coordinator shall contact KEH Safety and WHC Project Coordinator.

Page 21 of 24  
Rev. No. 0

Mgr. KEH Safety	<u>T. H. Lovatt</u>	Phone (w) 6-4117 (h) 948-9080 (R) J-10
KEH Safety Supv.	<u>S. R. Turney</u>	Phone (w) 3-4791 (h) 582-8944 (R) J-44
Project Coordinator	<u>R. A. Carlson</u>	Phone (w) 6-9027 (h) 946-1320 ----
Mgr. WHC Safety	<u>H. N. Bowers</u>	Phone (w) 3-3948 (h) 627-4817 ----



The following items will be checked and verified where applicable prior to start of work:

	Yes	N/A
Fully charged ABC Class fire extinguishers available on site?	___	___
Fully stocked First Aid Kit available on site?	___	___
All project personnel advised of location of nearest phone?	___	___
All project personnel advised of location of designated medical facility or facilities?	___	___
Decontamination Trailer on site?	___	___
All PPE on site?	___	___
Bottle cart and breathing air on site?	___	___
Site Safety Plan covered in pre-job safety meeting?	___	___
Emergency personnel notified of field activities?	___	___
Preparations made for drillers to be covered by buddy system in case of emergency?	___	___
Two-way radio communications available on site?	___	___

\_\_\_\_\_  
Printed name of Field Team Leader and Site Safety Officer

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date



30. Field Procedures Change Authorization

Instruction Number      Duration of Authorization Requested      Date: \_\_\_\_\_  
to be changed              \_\_\_\_\_ Today only  
                                 \_\_\_\_\_ Duration of Task

Description of Procedures Modification:

Justification:

Person Requesting Change:

Verbal Authorization Received From:

\_\_\_\_\_  
Name

\_\_\_\_\_  
Name

\_\_\_\_\_  
Time

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Approved by

(Signature of person named above to  
be obtained within 48 hours of verbal  
authorization)  
FTL concurrence prior to implementation  
of change(s).

**KAISER  
ENGINEERS  
HANFORD**

KAISER ENGINEERS HANFORD COMPANY  
POST OFFICE BOX 888  
RICHLAND, WASHINGTON 99352

REG NO KAISEEH1348M

March 23, 1990

Mr. J. B. Levine, Manager  
Environmental Health Physics  
Westinghouse Hanford Company  
P. O. Box 1970  
Richland, Washington 99352

Dear Mr. Levine:

**RADIOLOGICAL CHARACTERIZATION FOR 200-BP-1 OPERABLE UNIT**

We are currently preparing a Health and Safety Plan for groundwater monitoring wells to be installed around the 200-BP-1 Operable Unit. Please indicate the radiological hazard rating as defined by the attached table. Radiological monitoring and protective equipment requirements will be implemented as specified in the table unless otherwise indicated. Please supply the requested information by March 28th, as we are committed to complete the Health and Safety Plan by April 2, 1990.

Sincerely,

*David Foust*

D. J. Foust, Manager  
Radiation Protection

cc: R. S. Spaniel  
T. L. Walton

**Radiological Hazard Rating**

Well Numbers: 699-48-50, 699-49-57(B), 699-50-53(B), 699-52-54 (map attached)

☒ None  
☒ Low  
☐ Moderate  
☐ High

Radiation Work  
Permit Required:

☐ Yes ☒ No

Primary Radiological Contaminants: LOW LEVEL TRITIUM + WIND BLOWN

CONTAMINATION FROM UPWIND SURFACE CONTAMINATION AREAS.

Additional Comments:

RATING BASED ON TRITIUM PLUME MAPS CONTAINED IN RI/FS WORK PLAN (DET)  
# DOE/RL 88-32. WELL #49-57 AND #50-53 APPEAR TO BE CLOSEST TO THE  
KNOWN TRITIUM PLUME.

Evaluation Performed By: *[Signature]*

Date: 3-27-90

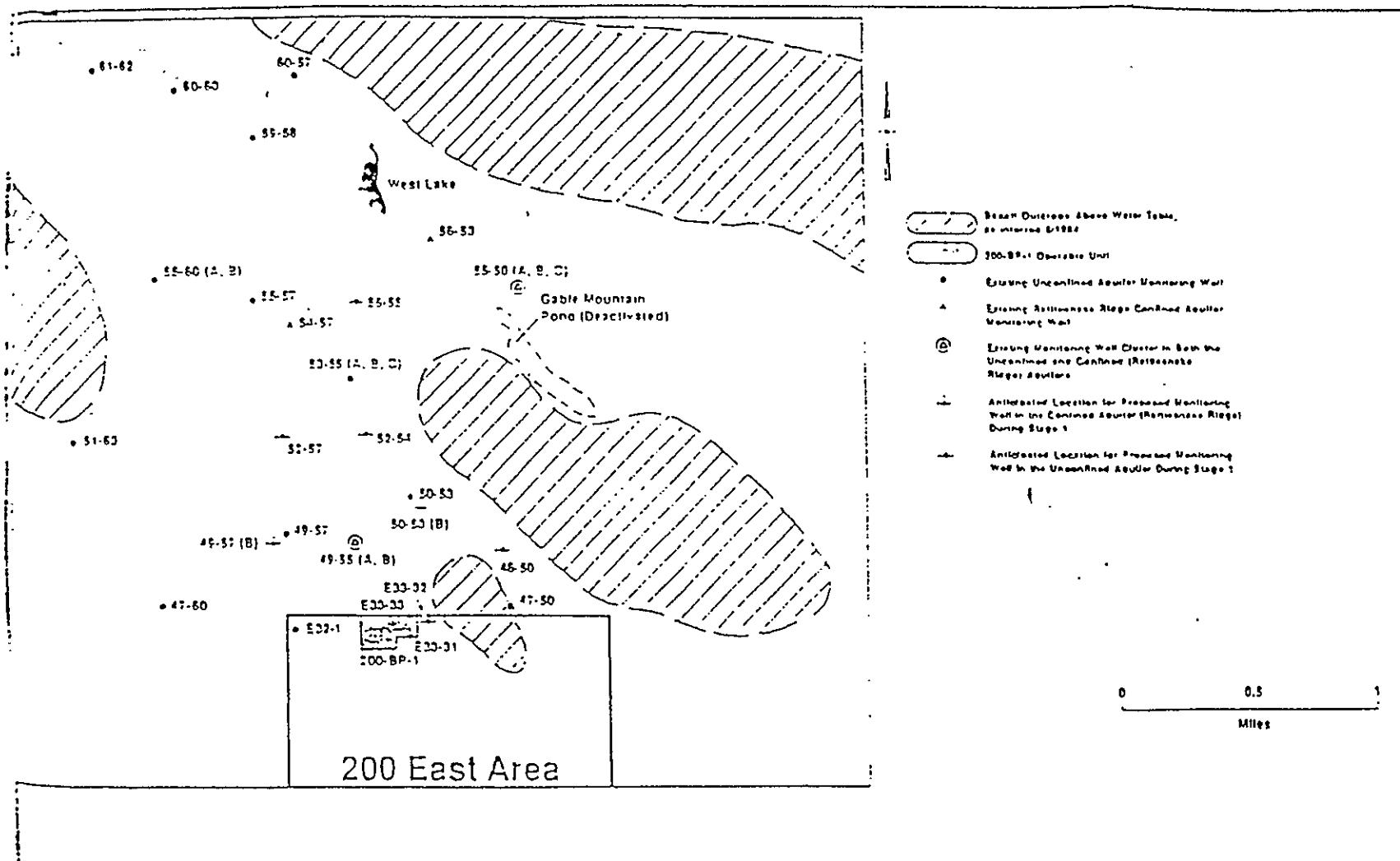
Evaluation Reviewed By: *[Signature]*

Date: 3-28-90

Kaiser  
Engineers  
Hanford

# Radiological Hazard Rating System RCRA/CERCLA Well Drilling

Radiological Hazard Rating	Radiological Monitoring Required	PPE Required (Radiological)	Comments
None No known contamination	None HP supervision cognizant of operation	None except as specified by HASP	No RWP required
Low Suspected low level contamination	Intermittent Minimum of twice per shift	None unless contamination is encountered and as specified by HASP	No RWP required. Work shall stop and RWP developed if contamination is detected.
Moderate Known low level contamination not expected to be encountered	Continuous HPT cognizant of site conditions	None unless contamination is encountered and as specified by HASP	RWP required
High Expected to encounter contamination or known high levels of contamination	Continuous HPT monitoring continuously during downhole operations	Yes As prescribed by RWP and HASP unless modified by agreement of HPT and SSO	RWP required



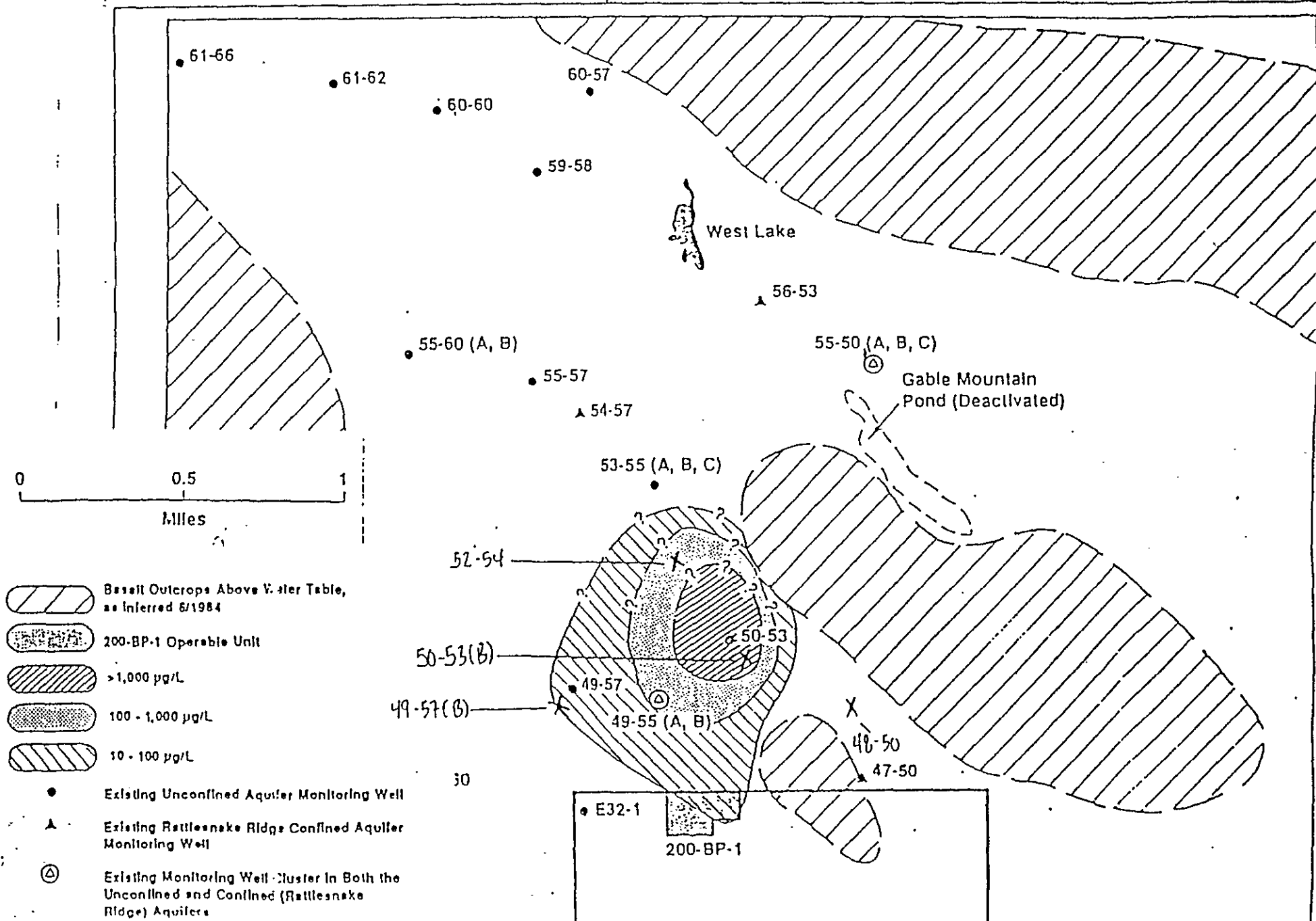
1983-1726/12704

Location Map for Proposed  
Monitoring Wells During Task E,  
Stage 1 of Phase I.

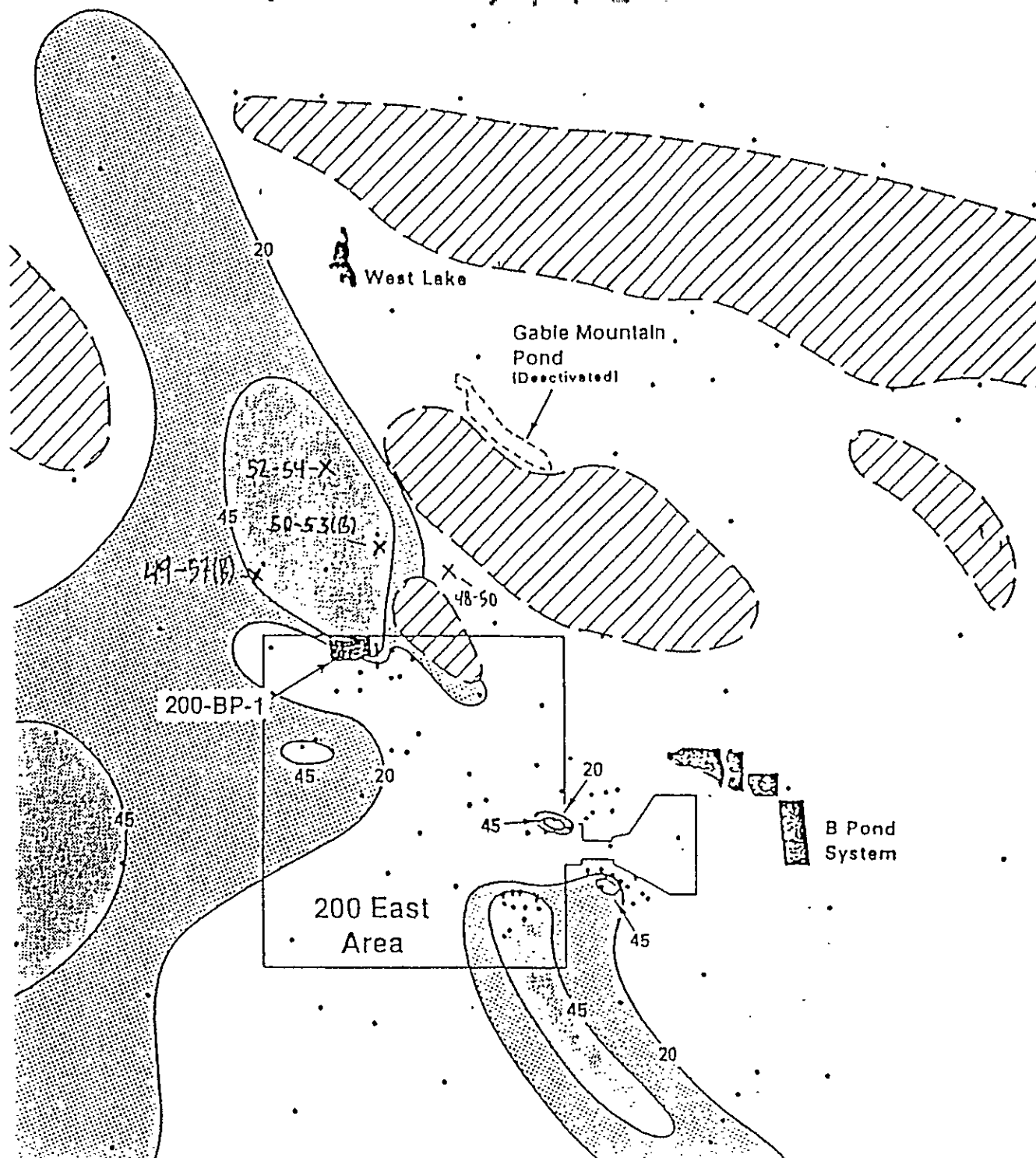
SAP/FSP-31/32



# Estimated Cyanide Plume in the Unconfined Aquifer



# Nitrate Plume Within the Seperation Area (1987)



p/m NO<sub>3</sub>

< 20

20-44.9

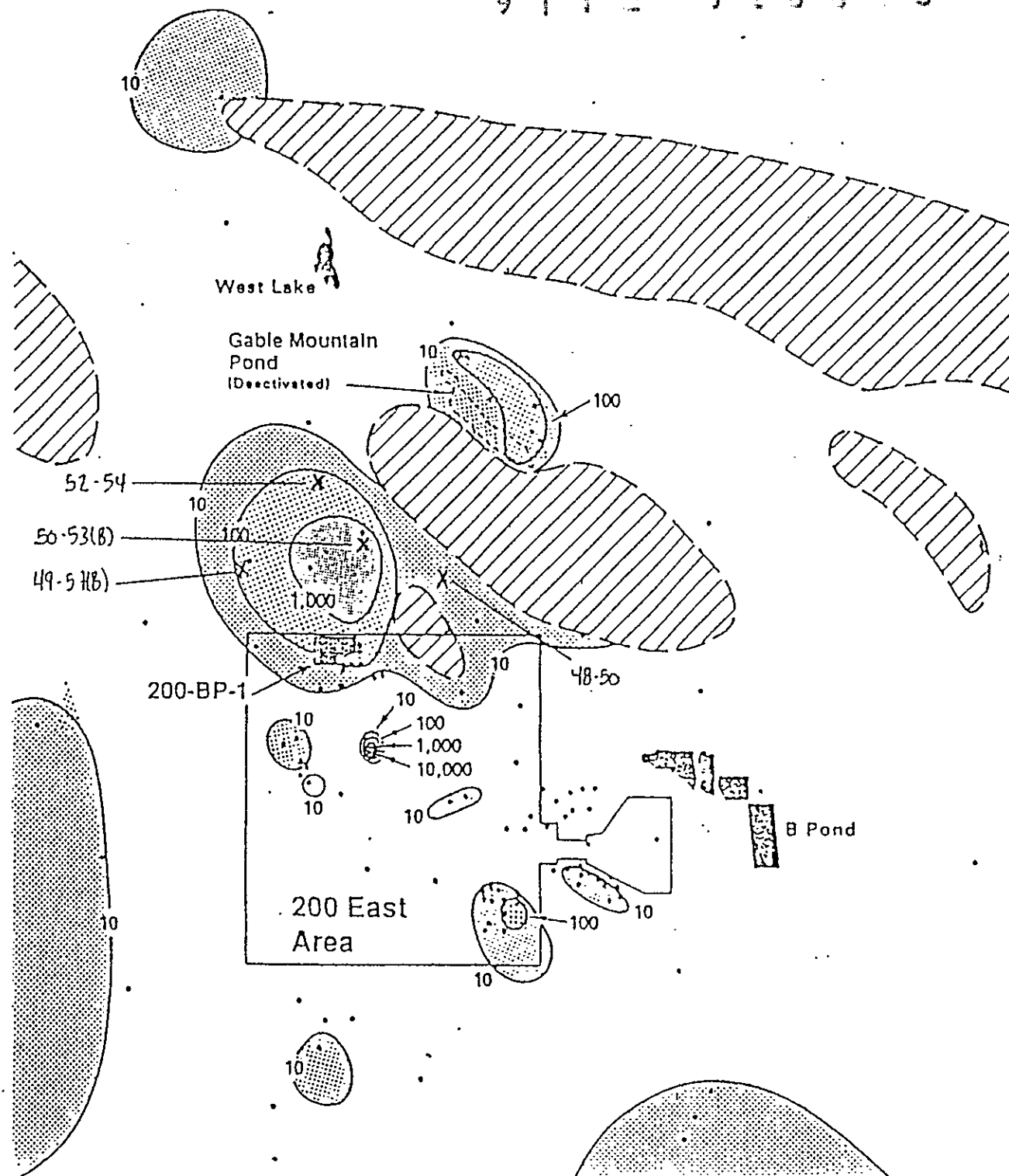
≥ 45

⊙ Locations of Wells &  
for Nitrate in 1987

Estimated Basalt Out  
Above Water Table

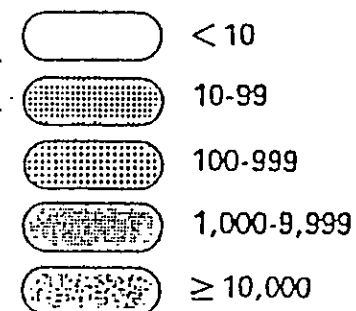
0 1 Mile

0 1 Kilometer



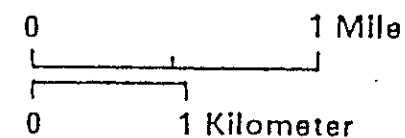
Total Beta Plume Within the Separation Area (1987)

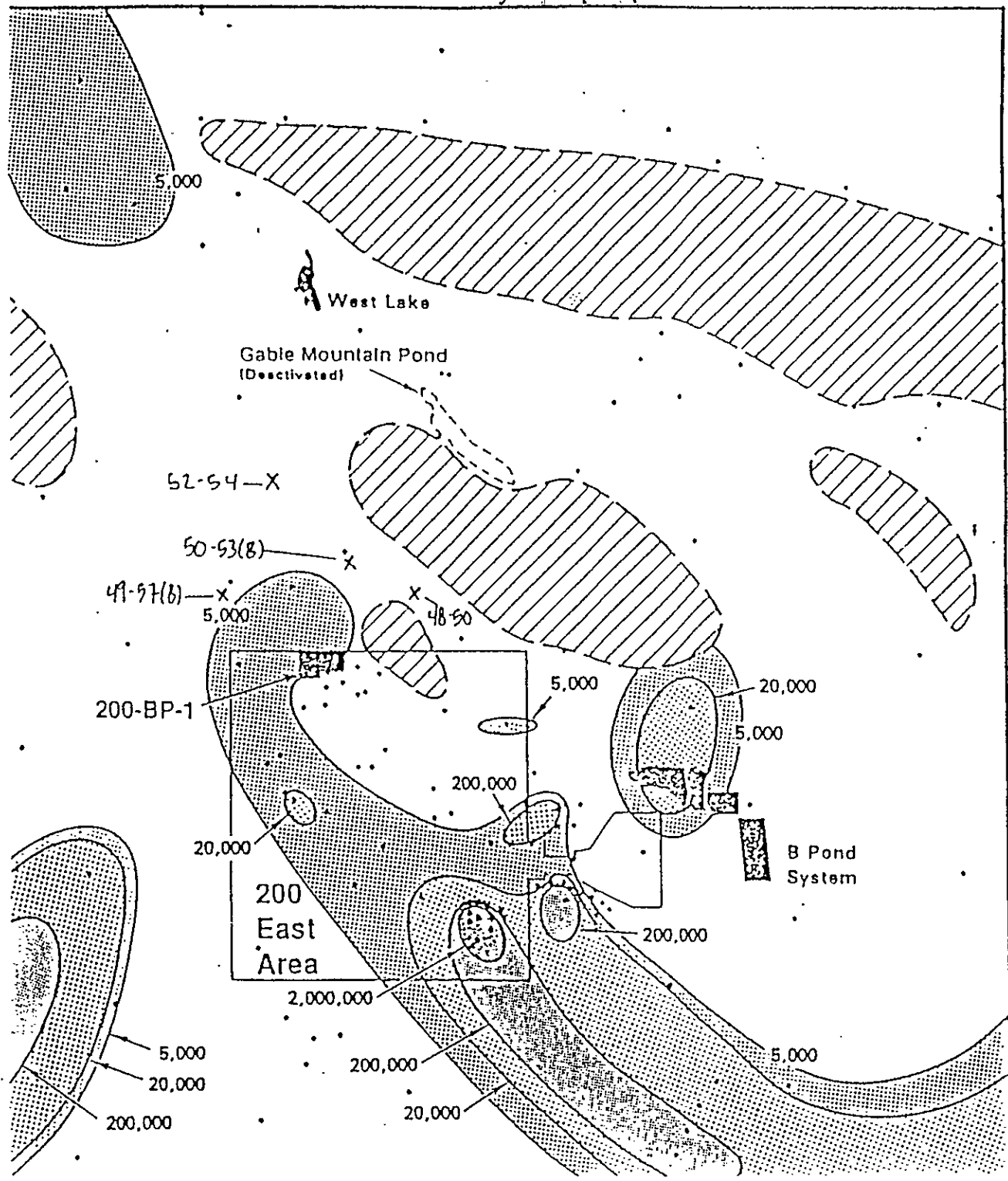
Total Beta pCi/L



Locations of Wells Sampled for Total Beta in 1987

Estimated Basalt Outcrops Above Water Table





Tritium Plume Within the Separation Area (1987)

Tritium pCi/L

- < 5,000
- 5,000-19,000
- 20,000-199,000
- 200,000-1,999,000
- ≥ 2,000,000

- Locations of Wells Sam for Tritium in 1987
- Estimated Basalt Outcrop Above Water Table





# JOB SAFETY ANALYSIS

Reviewed By Safety		Job Description Ground Water Monitoring Well Installation, 600 Area		KEH Number ---	
Date 8/31/90	Initials <i>[Signature]</i>	Job Phase Universal		Building ---	
Work Order/Job Number ---		Prepared By IS&H: Spaniel, Somers, Turney		Area Site-wide	Date 8-31-90

Safety Equipment Required	Tools and Equipment Required	Hazardous Materials
Personal Protective Equipment LEVEL <u>D</u> (describe) ** Eye Protection ** Hardhats Face shield Hearing protection Full Face respirators w/HEPA cartridge Approved dust respirators Safety belts w/6 foot lanyards 2-20# ABC fire extinguishers Radio (capable of 2-way communications) Organic Analyzer Oxygen/Explosive Gas Analyzer pH paper GFCI unit (if applicable) Spark arrestors Flashback arrestors Drinking Water Wash water Liquid Soap and Dispenser ** Gloves ** Steel toe boots Coveralls  ** When operating in Level "D", visitors and non-KEH support personnel should arrive on-site with these items	Decontaminated, inspected drill rig and tools Casing (steam cleaned and residue free) Well development materials Cement mixer Shovels (2) Grader/loader Signs w/stands (Entry/Exit, Authorized Personnel Only, Fire Hazard, Hearing Protection Required) Portable welder, leads, welding rod OXY-acetylene cutting unit Wooden or fiberglass ladder approved for electrical use Barricades, barricade tape, rope, flashers Shade canopy, (hot weather) Shelter or wind break (cold weather)	Silica sand Grout Bentonite Concrete See SSSP for chemical and radionuclide listings
	Radiation Work Permit Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Inspection Report for Asbestos (Required) Date Received _____

Work Activity	Hazard	Safety Measures
The work activities, hazards and safety measures contained in this JSA are based on Level D personal protection equipment with no anticipated contamination. If hazardous waste or radiological materials are encountered above the action levels, more stringent procedures will be imposed. The new requirements will be outlined in the SSSP or revised JSA. The procedure used will be recorded in the logbook.		
I. SITE PREPARATION A. Cleaning and Grubbing	I. SITE PROTECTION A. Fire	I. SITE PREPARATION A. 1. Spark arrestors, fire extinguishers and shovels

# Job Safety Analysis

Pg. 2 of 7

Work Activity	Hazard	Safety Measures
I. SITE PREPARATION	I. SITE PROTECTION	I. SITE PREPARATION
B. Drill Rig and Materials Placement	B. <ol style="list-style-type: none"> <li>Physical sprains and strains</li> <li>Pinning and crushing injuries from overhead loads</li> <li>Falls</li> <li>Rig Movement</li> <li>Ground Contamination</li> </ol>	A. <ol style="list-style-type: none"> <li>Smoking in designa- areas only (outside control zone)</li> </ol> B. <ol style="list-style-type: none"> <li>Use drill rig, heavy support equipment and/or "Buddy System" for material handling.</li> <li>Use correct equipment, proper rigging and handling of loads</li> <li>a. Use safety belt/lanyard b. Lash ladder to a stationary object</li> <li>Block and choke rig</li> <li>Placement of heavy mil plastic under drill rig</li> </ol>
C. Control or Exclusion Zone (Zone)	C. <ol style="list-style-type: none"> <li>In control zone, physical contact with nuisance contaminants, i.e. dust, soil, well cuttings, grease, etc.</li> <li>In an exclusion zone, physical contact with hazardous waste and airborne contamination</li> <li>Physical Injury</li> </ol>	C. <ol style="list-style-type: none"> <li>Define size and configuration of Zone with boundary tape or rope</li> <li>Placement and use of proper warning signs</li> <li>Surveillance by a SSO</li> <li>Require hazardous waste training and OJT before entering the Zone.</li> <li>Familiarization with SSSP</li> </ol>

# Job Safety Analysis

Pg. 3 of 7

Work Activity	Hazard	Safety Measures
II. WELL DRILLING A. Drilling Activity	II. WELL DRILLING A. 1. Noise 2. Physical sprains and strains 3. Pinning and crushing injuries 4. Falls 5. Foot injuries 6. Head injury 7. a. Eye irritation b. Eye injury c. Eye Blindness 8. Ground contamination 9. Airborne contamination	II. WELL DRILLING A. 1. Hearing protection required 2. I.B.I. 3. a. Blocking stored casing b. I.B.2 c. Daily inspection of rig and tools 4. I.3.a I.3.b 5. Hard hat required 6. a. Safety glasses, goggles and face shields. b. Use of proper welding eye protection 7. a. I.B.5 b. Routine monitoring of bore hole, breathing zone, and spoils c. Barreling of purge water spoils

Work Activity	Hazard	Safety Measures
<p>II. WELL DRILLING</p> <p>B. Cutting, grinding, placement, and welding of steel casing.</p> <p>C. Sample Collection.</p>	<p>II. WELL DRILLING</p> <p>B.</p> <ol style="list-style-type: none"> <li>1. Physical sprains and strains</li> <li>2. Explosion</li> <li>3. Fire</li> <li>4. Burns, cuts and puncture wounds</li> <li>5. Eye irritation, injury or blindness</li> </ol> <p>C.</p> <ol style="list-style-type: none"> <li>1. Skin/respiratory contamination</li> <li>2. Explosions</li> </ol>	<p>II. WELL DRILLING</p> <p>B.</p> <ol style="list-style-type: none"> <li>1. I.B.1</li> <li>2. Survey bore hole with LEL analyzer to detect combustible gases</li> <li>3. Flammables covered with fire blanket. Fire extinguishers and shovels on hand</li> <li>4. Wear gloves; use proper PPE</li> <li>5. II.6.a.b</li> </ol> <p>C.</p> <ol style="list-style-type: none"> <li>1. Familiarization with SSSP; notably: site characterization (history and hazard evaluation)</li> <li>2. a. Surveillance of air and soil, with organic analyzer, to detect levels of contamination               <ol style="list-style-type: none"> <li>b. Check corrosive level (pH) with color indicating. litmus paper</li> <li>c. Use of required PPE</li> </ol> </li> <li>3. Monitor bore hole for combustible gases using a LEL analyzer</li> </ol>

Work Activity	Hazard	Safety Measures
III. WELL DEVELOPMENT	III. WELL DEVELOPMENT	III. WELL DEVELOPMENT
A. Straightness Test	A. 1. Physical sprains and 2. Pinning and crushing injuries from overhead load	A. 1. I.B.1 2. I.B.2
B. Logging	B. Tripping	B. Limit work activity at bore hole and general vicinity of logging truck and equipment
C. Installation of screen and permanent stainless steel casing (jacks in place)	C. 1. Physical sprains and strains 2. Pinning and crushing injuries from overhead loads 3. Falls/Tripping	C. 1. I.B.1 2. I.B.2 3. Safe work practice, Buddy System
D. 1. Silica Sand Installation 2. Bentonite Installation 3. Grout Installation (Jacks in place)	D. 1. Inhalation of silica sand 2. Dust inhalation 3. a. Dust inhalation b. Skin and eye irritation/burn 4. Falls/Tripping	D. 1. Wear full face respirator w/HEPA cartridge 2. Approved dust respirator recommended 3. a. Approved dust respirator recommended b. Use of rubber type gloves goggles or face shields are required 4. III.C.3
E. Back Pulling Operations (Hydraulic jacks and/or drilling rig and jars)	E.	E.

Work Activity	Hazard	Safety Measures
III. WELL DEVELOPMENT	III. WELL DEVELOPMENT	III. WELL DEVELOPMENT
	1. Fire	1. Shield or contain sparks and slag during cutting operation
	2. Noise	2. Hearing protection
	3. Burns	3. See III.E.1 wear gloves and other appropriate PPE
	4. Physical strains	4. I.B.1
	5. Eye injury	5. II.G.a.b
	6. Pinning and crushing injuries	6. Before cutting extended casing, secure with rig choker
	7. Falls/Tripping	7. III.C.3
	8. Injury from flying debris	8. All personnel are to stand clear during casing extraction
F. Equipment Decontamination	F. 1 & 2	F. 1 & 2
1. Steam clean rig	1. Physical strains	1. I.B.1
2. Steam cleaning tools and other equipment	2. Eye irritation/injury	2. Use proper safety eye & face protection
	3. Falls/Tripping	3. III.C.B
	4. Burns	4. Wear gloves; use proper PPE and rain gear
G. Installation of Concrete Pad and Barrier Posts	G.	G.
	1. Physical strains	1. I.B.1
	2. Skin and eye irritation/burns	2. III.3.b
H. Pump Installation and Testing	H.	H.
	1. Physical strains	1. I.B.1
	2. Electric shock	2. Ground pump and generator
	3. Contamination from purge waters	3. Avoid contact; wear appropriate PPE
I. Site Cleanup	I.	I.
	1. Physical strains	1. I.B.1
	2. Puncture wounds	2. Remove nails from forms and wear gloves

# Job Safety Analysis

Pg. 7 of 7

Work Activity	Hazard	Safety Measures
III. WELL DEVELOPMENT	<p>III. WELL DEVELOPMENT</p> <p>3. Pinning and crushing injuries</p> <p>4. Contamination from barrels containing tainted spoils</p>	<p>III. WELL DEVELOPMENT</p> <p>3. I.B.2</p> <p>4. a. Inspect barrel for water tight seal</p> <p>b. When loading stand clear to avoid splashes that may occur if seal is broken or barrel is punctured</p>

## APPENDIX A

### TYPICAL DECONTAMINATION PROCEDURES

Decontamination - the removal or neutralization of contaminants that have accumulated on personnel and equipment - is critical to the health and safety at waste/work sites. Decontamination protects workers from hazardous substances that may contaminate and eventually permeate the protective clothing, respiratory protection, tools, and other equipment used onsite. It protects the integrity of site control by minimizing the transfer of contaminants into a clean zone, minimize mixing of incompatible chemicals and utmost protects the dissemination of workplace hazards to the community or off-site. If site specific decontamination procedures differ from the outline stated below, the SSSP shall prevail.

#### LEVEL B DECONTAMINATION

- |            |                              |   |
|------------|------------------------------|---|
| Station 1: | Equipment Drop               | 1. Deposit equipment used onsite (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area. |
| Station 2: | Outer Garment                | 2. Scrub outer boots, outer gloves, sampling bottles, and chemical-resistant splash suit with decon. solution or detergent water. Rinse off using copious amounts of water. Collect decon. solution and rinseate.   |
| Station 3: | Outer Boot and Glove Removal | 3. Remove outer boots and gloves. Deposit in container with plastic liner.  |
| Station 4: | Tank Changes                 | 4. If a worker leaves the exclusion zone to change his air tank, this is the last step in the decontamination procedure. The worker's air tank is exchanged, new outer gloves and boot covers donned, joints taped, and the worker returns to duty.   |



Station 5: Boot, Gloves  
and Outer Garment  
Removal

5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.

Station 6: SCBA Removal

6. SCBA backpack and facepiece is removed. Avoid touching face with finger. SCBA deposited on plastic sheets.

Station 7: Field Wash

7. Hands, face and other soiled areas are thoroughly washed. Shower as soon as possible.

#### LEVEL C DECONTAMINATION

Station 1: Equipment Drop

1. Deposit equipment used onsite (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool down station may be set up within this area.

Station 2: Outer Garment,  
Boots, and Gloves  
Wash & Rinse

2. Scrub outer boots, outer gloves, sample bottles, sample collection equipment and splash with decon. solution or detergent water. Rinse off using copious amounts of water. Collect decon. solution and rinseate.

Station 3: Outer Boot and  
Glove Removal

3. Remove outer boots and gloves. Deposit in container with plastic liner.

Station 4: Canister or  
Mask Change

4. If a worker leaves the exclusion zone to change his canister (or mask) this is the last step in the decontamination procedure. The workers' canister is exchanged, new outer gloves and boot covers are donned

joints taped, and the worker returns to duty.

Station 5: Boot, Gloves  
and Outer Garment  
Removal

5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.

Station 6: Face Piece  
Removal

6. Facepiece is removed. Avoid touching face with fingers. Facepiece deposited on plastic sheet.

Station 7: Field Wash

7. Hands, face and other soiled areas are thoroughly washed. Shower as soon as possible.

#### LEVEL D DECONTAMINATION (EXCLUSION ZONE)

1. Segregate and deposit on plastic, equipment used in the zone (tools, sampling devices, containers, monitoring instruments, radios, clipboards, etc.).
2. Remove dust, dirt, and caked-on debris from coveralls, gloves, footwear, and hardhat. As required, brush, scrap, or wash off contamination. To prevent the spread of contaminants, collect all wash and rinse waters. Equipment leaving the zone must also be decontaminated as described above.
3. Doff coveralls and then gloves. Wash all exposed body parts with soap and water. Collect wash and rinse waters.
4. If protective clothing is heavily soiled or the work day has ended, place coveralls in laundry bag for cleaning.

#### LEVEL D DECONTAMINATION (CONTROL ZONE) -

1. Wipe any loose dust or dirt from field equipment and instruments. If necessary a clean damp cloth may be used to facilitate this task.
2. With a hand broom, brush off coveralls, boots and gloves to remove loose soil. At the end of the work shift or when changing out of soiled coveralls, deposit washable garments in the proper laundry bag. Place disposable garments in the appropriate container.
3. Wash hands, face, and any other soiled body parts with soap and water before eating, drinking, smoking, using toilet facilities, or leaving at end of day. Use a scrub brush to remove stubborn soils.

APPENDIX B

TRAINING, EDUCATION AND ZONE ENTRY REQUIREMENTS \*

Employee training requirements for hazardous waste sites are job specific, with the level of training being consistent with the workers job function and responsibilities. An employees qualifications can be the result of education, on and off site experience, classroom instruction, hands-on instruction, training programs, etc.

Employees shall not engage in field activities until they have been thoroughly trained to a level commensurate with their job function and responsibilities.

NOTE: Entry shall be denied if evidence of compliance to the requirements cannot be determined. Employees or visitors must be able to produce field documentation or other evidence of required hazardous waste training. Training from other locations will be accepted if it meets all OSHA mandatory and DOE Order requirements.

Hazardous Waste Worker (KEH)

Each employee requiring entry into a control or exclusion zone must meet the following requirements before access will be permitted. Drillers, Geologists, Inspectors, Safety, Operators, and assigned craft personnel are all classifications which need the following requirements.

- . 40-hour hazardous waste training as defined in OSHA 29 CFR 1910.120;
- . 24-hour supervised OJT at a hazardous waste site (or in progress);
- . 8-hour annual refresher course (if applicable);
- . Hearing conservation training;
- . Hazardous waste medical surveillance;
- . Security badge and specific area/facility clearance as required/approved;
- . Other training as needed for specific activities or conditions, including but not limited to:
  - a. Radiation worker training
  - b. Mask fit and respirator use training
  - c. Combustible gas monitoring training
  - d. Radiation dosimetry and whole body count (where a radiation zone or area may be entered)

\*In order to minimize downtime, all training will be consistent with hazardous waste site requirements, in the event an upgrade is necessary. Objective evidence must be presented (see attached forms) prior to entry.

- . Pre-job safety meeting, to include the following:
  - a. Site control and characterization
  - b. Site-specific physical, chemical and biological hazards.
  - c. Job Safety Analysis, including PPE
  - d. Proper decontamination for personnel and equipment
  - e. Emergency preparedness plan, lines of responsibility and procedures
  - f. Employee rights and responsibilities
  - g. Exposure potentials and mitigation steps
  - h. General safe work practices
  - i. Employee questions and suggestions
  - j. Changes, deletions or additions to the HASP

Hazardous Waste Supervisor (KEH)

Supervisors of Hazardous Waste Workers are required to complete all training listed above, plus an 8-hour Hazardous Waste Supervisors course as defined in OSHA 29 CFR 1910.120.

Site Safety Officer (KEH)

The Site Safety Officer is required to complete both the Hazardous Waste Worker/Supervisor Training in addition to:

- . Such training as may be necessary for the proper operation, maintenance, calibration, and interpretation of sampling/monitoring data; and
- . Fundamental instruction in Health and Safety Hazard Recognition.

Visitors and Support Personnel (KEH)

Where no adverse conditions exist and respirators are not required, each visitor and support person having a "need to access" the control/exclusion zone will receive as a minimum the following prior to entry:

- . 24-hour hazardous waste training as defined in OSHA 29 CFR 1910.120;
- . 8-hour supervised OJT at a hazardous waste site (or in progress);
- . 8-hour annual refresher course (if applicable);
- . Hazardous waste medical surveillance;
- . Health and Safety Plan briefing;
- . Security badge and specific area/facility clearance as required/approved;
- . Escort for visitors; and
- . Other training as needed for specific conditions.

---

KAISER ENGINEERS  
HANFORD COMPANY

SITE SPECIFIC SAFETY PLAN

---

Training Westinghouse Hanford Company

The Cognizant Manager will facilitate the Hazardous Waste Worker training for all personnel under his/her employ.

The Hazardous Waste Worker will attend annual or biennial retraining as required. The specific courses include:

WHC Certification Program - 020200: Hazardous Waste Site Operator - Advanced (40 hr)\*

<u>Required Components</u>	<u>Course No.</u>	<u>Required Retraining</u>
Fire Extinguisher Safety Orientation	02006F	Annual
Hazardous Waste Site - Advanced	020201	8-Hr Annual Refresher (020060)
Scott SKA Pak <sup>1</sup> -MSA PAPR <sup>2</sup>	020032	Annual
Generator Hazards Safety Training	02006G	Biennial
Hazardous Material/Waste Job Specific Information	01006H	Annual
Radiation Worker Initial Training	020001	Biennial (020003)
CPR	020123	Biennial
Waste Site Field Experience	020202	None

\*NOTE: Training equivalent to that required by WHC may be accepted by cognizant management in lieu of 020200.

---

<sup>1</sup>Trademark of Scott Aviation, Lancaster, New York.

<sup>2</sup>Trademark of Mine Safety Appliance Company, Pittsburgh, Pennsylvania.

The level of training provided shall be consistent with the employee's job function and responsibilities. Personnel may be designated for additional training such as 8 hr. supervisor training (WHC Course No. 020250), first aid training (WHC Course No. 020055), or asbestos training, as outlined in the site HWOP. Onsite emergency response personnel as designated by cognizant management shall be trained in SCBA (self-contained breathing apparatus) and First Aid.

---

KAISER ENGINEERS  
HANFORD COMPANY

SITE SPECIFIC SAFETY PLAN

---

Waste Site Field Experience

Waste Site Field Experience shall be accomplished under the direct supervision of trained, experienced supervisory personnel (e.g., Field Team Leader, Site Safety Officer).

Visiting Personnel Within a Control Zone

All visiting personnel requiring entry into a control zone will follow KEH established guidelines. The WHC Field Team Leader must be notified of visiting personnel. In addition the visitor must read the site HWOP and attend all mandatory safety meetings. A Bio-Assay may be required on a case-by-case basis as required by Occupational Health Physics.

Westinghouse  
Hanford Company

SUPERVISED FIELD EXPERIENCE

\_\_\_\_\_  
(Name)

\_\_\_\_\_  
(Payroll No.)

The above named individual received a minimum of three days Hazardous  
Waste Site field experience as listed below

Hazardous Waste Site Experience

Location(s), Date(s), and Hour(s) experience received:

Data From:

_____	_____
_____	_____
_____	_____
_____	_____

Field Experience Validated By:

\_\_\_\_\_  
(Sign/Print Name)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Title of Validator)

Manager:

\_\_\_\_\_  
(Sign/Print Name)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Title of Manager)

PROJECT: \_\_\_\_\_  
ANTICIPATED START DATE: \_\_\_\_\_

SAFETY, TRAINING, AND PERSONNEL REQUIREMENTS  
FOR EET&P FUNCTION HAZARDOUS WASTE WORKERS

1. Name: \_\_\_\_\_  
Job Title: \_\_\_\_\_  
Payroll Number: \_\_\_\_\_  
Social Security Number: \_\_\_\_\_

2. This worker is a participant in the company Medical Surveillance Program as required by OSHA 29 CFR 1910.120 and is medically cleared to perform work at a hazardous waste site.

YES \_\_\_\_\_ NO \_\_\_\_\_

3. SAFETY EQUIPMENT:	REQUIRED	
	YES	NO
Hard Hat	_____	_____
Safety Glasses	_____	_____
Substantial Footwear	_____	_____

4. TRAINING	DATE COMPLETED
40 Hr Hazardous Waste Worker (WHC #020201), or 3-Hr annual refresher (WHC #020060) or equivalent	_____
24 Hr Waste Site Field Experience (WHC #020202) (or in progress)	_____
Mask Fit from HEHF	_____
Radiation Worker Initial Training (WHC #020001 or Requal: WHC #020003)	_____
Scott SKA Pak-MSA PAPR (WHC #020032)	_____
CPR (WHC #020123)	_____
Fire Extinguisher Safety Orientation (WHC #02006F)	_____
Generator Hazard Safety Training (WHC #02006G)	_____
HazMat/Waste Job Specific (WHC #02006H)	_____



# 5. ADDITIONAL TRAINING

	REQUIRED		DATE COMPLETED
	YES	NO	
Self-Contained Breathing Apparatus (SCBA - WHC #020030)	_____	_____	_____
OSHA 8 Hr Supervisor Training (WHC #020250 or equivalent)	_____	_____	_____
First Aid (WHC #020055)	_____	_____	_____
Other: _____	_____	_____	_____
Other: _____	_____	_____	_____

\_\_\_\_\_ is medically cleared to perform hazardous waste work. The required training has been verified as complete and the above employee is qualified to work on a Hazardous Waste Site.

If there are changes that affect the status of either the medical clearance or the training certification during the duration of the work (such as medical restrictions or expired training), the Environmental Health and Pesticide Services Manager will be notified immediately.

Manager: \_\_\_\_\_

Organization: \_\_\_\_\_

Date: \_\_\_\_\_

Training and Medical Clearance Information Verified by:

Name: \_\_\_\_\_

Date: \_\_\_\_\_

SAFETY, TRAINING, AND PERSONNEL REQUIREMENTS  
FOR HAZARDOUS WASTE WORKERS

TO: \_\_\_\_\_

FROM: Environmental Field Services Group

Contact: \_\_\_\_\_

Phone: \_\_\_\_\_

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

ANTICIPATED START DATE: \_\_\_\_\_

Please complete pages 1 and 2 (attached) for each employee assigned to support the Environmental Engineering, Technology and Permitting Function in hazardous waste site activities. Site requirements relative to safety equipment, training, and medical surveillance programs are addressed.

Each assigned employee must have all safety equipment and meet all other noted requirements prior to start of work.

Job Titles of support personnel and/or alternates requested:

NUMBER

JOB TITLE

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

PROJECT: \_\_\_\_\_  
ANTICIPATED START DATE: \_\_\_\_\_

SAFETY, TRAINING, AND PERSONNEL REQUIREMENTS  
FOR HAZARDOUS WASTE WORKERS

1. Name: \_\_\_\_\_  
Job Title: \_\_\_\_\_  
Payroll Number: \_\_\_\_\_  
Social Security Number: \_\_\_\_\_  
Company: \_\_\_\_\_

2. This worker is a participant in the company Medical Surveillance Program as required by OSHA 29 CFR 1910.120 and is medically cleared to perform work at a hazardous waste site.

YES \_\_\_\_\_ NO \_\_\_\_\_

	REQUIRED	
	YES	NO
3. SAFETY EQUIPMENT:		
Hard Hat	_____	_____
Safety Glasses	_____	_____
Substantial Footwear	_____	_____

4. TRAINING	DATE COMPLETED
40 Hr Hazardous Waste Worker (WHC #020200), or 3 Hr annual refresher (WHC #020060) or equivalent.	_____
24 Hr Waste Site Field Experience (WHC #020202 or equivalent) may be complete or in progress.	Complete _____ In Progress _____
Mask Fit from HEHF	_____
Radiation Worker Initial Training (WHC #020001 or Recual: WHC #020003)	_____
Scott SKA Pak-MSA PAPR (WHC #020032)	_____

5. ADDITIONAL TRAINING	REQUIRED		DATE COMPLETED
	YES	NO	
CPR/First Aid	_____	_____	_____
KEH #OSH-070003			
Self-Contained Breathing Apparatus	_____	_____	_____
KEH #OSH-110005			
OSHA 3 Hr Supervisor Training	_____	_____	_____
KEH #OSH-060016			
Other: _____	_____	_____	_____
Other: _____	_____	_____	_____

\_\_\_\_\_ is medically cleared to perform hazardous waste work. The required training has been verified as complete and the above employee is qualified to work on a Hazardous Waste Site.

If there are changes that affect the status of either the medical clearance or the training certification during the duration of the work (such as medical restrictions or expired training), the Environmental Health and Pesticide Services Manager will be notified immediately.

Manager: \_\_\_\_\_

Organization: \_\_\_\_\_

Date: \_\_\_\_\_

Training and Medical Clearance Information Verified by:

Name: \_\_\_\_\_

Date: \_\_\_\_\_

SAFETY, TRAINING, AND PERSONNEL REQUIREMENTS  
FOR KEH HAZARDOUS WASTE WORKERS

SAFETY, TRAINING, AND PERSONNEL REQUIREMENTS  
FOR KEH HAZARDOUS WASTE WORKERS

TO: \_\_\_\_\_

FROM: Environmental Field Services Group  
Contact: \_\_\_\_\_  
Phone: \_\_\_\_\_

PROJECT: \_\_\_\_\_

LOCATION: \_\_\_\_\_

ANTICIPATED START DATE: \_\_\_\_\_

Please complete pages 1 and 2 (attached) for each employee assigned to support the Environmental Engineering, Technology and Permitting Function in hazardous waste site activities. Site requirements relative to safety equipment, training, and medical surveillance programs are addressed.

Each assigned employee must have all safety equipment and meet all other noted requirements prior to start of work.

Job Titles of support personnel and/or alternates requested:

NUMBER

JOB TITLE

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

NAME: \_\_\_\_\_  
PROJECT: \_\_\_\_\_  
ANTICIPATED START DATE: \_\_\_\_\_

SAFETY, TRAINING, AND PERSONNEL REQUIREMENTS  
FOR KEH HAZARDOUS WASTE WORKERS

1. Name: \_\_\_\_\_  
Job Title: \_\_\_\_\_  
Payroll Number: \_\_\_\_\_  
Social Security Number: \_\_\_\_\_  
Company: \_\_\_\_\_

2. This worker is a participant in the company Medical Surveillance Program as required by OSHA 29 CFR 1910.120 and is medically cleared to perform work at a hazardous waste site.

YES \_\_\_\_\_ NO \_\_\_\_\_

3. SAFETY EQUIPMENT:	REQUIRED	
	YES	NO
Hard Hat	_____	_____
Safety Glasses	_____	_____
Substantial Footwear	_____	_____

4. TRAINING	DATE COMPLETED
40 Hr Hazardous Waste Worker KEH #OSH-060004	_____
8 Hr Annual Refresher KEH #OSH-060014 (if applicable)	_____
24 Hr Waste Site Field Experience KEH #OSH-060015 (or in progress)	_____
Radiation Worker Initial Training KEH #OSH-020004	_____
Scott SKA Pak-MSA PAPR KEH #OSH-110003	_____
Mask Fit from HEHF	_____

# 5. ADDITIONAL TRAINING

	REQUIRED		DATE COMPLETED
	YES	NO	
Self-Contained Breathing Apparatus (SCBA - WHC #020030)	---	---	---
OSHA 3 Hr Supervisor Training (WHC #020250 or equivalent)	---	---	---
First Aid (WHC #020055)	---	---	---
Other: _____	---	---	---
Other: _____	---	---	---

\_\_\_\_\_ is medically cleared to perform hazardous waste work. The required training has been verified as complete and the above employee is qualified to work on a Hazardous Waste Site.

If there are changes that affect the status of either the medical clearance or the training certification during the duration of the work (such as medical restrictions or expired training), the Environmental Health and Pesticide Services Manager will be notified immediately.

Manager: \_\_\_\_\_

Organization: \_\_\_\_\_

Date: \_\_\_\_\_

Training and Medical Clearance Information Verified by:

Name: \_\_\_\_\_

Date: \_\_\_\_\_

HAZARDOUS WORK PERMIT/  
JOB SAFETY ANALYSIS SIGN-OFF

Job Number

### Job Location

[illegible]

XS44.1770 0075.000



HAZARDOUS WORK PERMIT/  
JOB SAFETY ANALYSIS SIGN-OFF

Job Number

### Job Location

[illegible]

**HAZARDOUS WASTE OPERATIONS PERMIT**

**KAISER ENGINEERS  
HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

**Page 1 of 35**

**Rev. No. 0**


**1. Project Name 200-BP-1 Operable Unit**

**Job Description Groundwater Monitoring Well Installation, Well 299-E33-38, -39 & -40**

**Requested By M. A. Buckmaster, WHC Technical Coordinator and J. T. Lilly, KEH Environmental Restorations**

**Proposed Start-up Date \_\_\_\_\_**

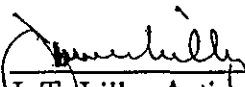
**APPROVALS - PRINTED NAME/SIGNATURE**

  
D. A. Lamar, Author, Bovay Northwest Inc.

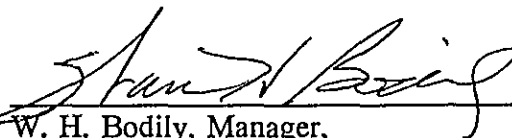
10/26/90  
Date

  
S. R. Turney, KEH, Well Site Safety Supervisor

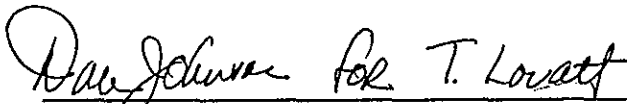
10/29/90  
Date

  
J. T. Lilly, Acting Manager,  
KEH Environmental Restoration Projects

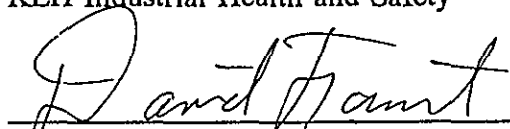
10/29/90  
Date

  
W. H. Bodily, Manager,  
KEH Environmental Compliance

10/30/90  
Date

  
T. H. Lovatt, Manager,  
KEH Industrial Health and Safety

10/30/90  
Date

  
D. J. Foust, Manager  
KEH Radiation Protection

10/29/90  
Date

---

---

HAZARDOUS WASTE OPERATIONS PERMIT

KAISER ENGINEERS  
HANFORD COMPANY

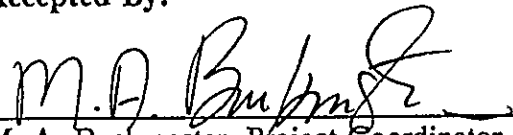
PROJECT 200-BP-1, 299-E33-38, -39, & -40

Page 2 of 35

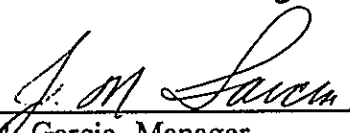
---

Rev. No. 0

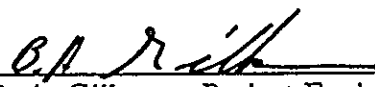
Accepted By:

  
\_\_\_\_\_  
M. A. Buckmaster, Project Coordinator  
WHC Environmental Engineering

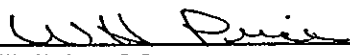
10/29/90  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
J. M. Garcia, Manager  
WHC Health Physics

10/29/90  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
B. A. Gilkeson, Project Engineer  
WHC Waste Management & Environmental Projects

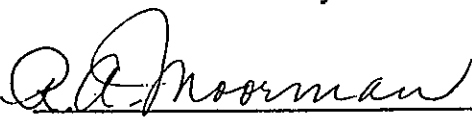
10/29/90  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
W. H. Price, Manager  
WHC Environmental Field Services

10/29/90  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
J. R. Bell, Manager  
WHC Industrial Safety & Fire Protection

10/29/90  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
R. A. Moorman  
HEHF Site Support Services

10-29-90  
\_\_\_\_\_  
Date

cc: D. E. Averyt  
Director of Nursing, HEHF

---

HAZARDOUS WASTE OPERATIONS PERMIT  
KAISER ENGINEERS  
HANFORD COMPANY

PROJECT 200-BP-1, 299-E33-38, -39, & -40  
Page 2a of 35

---

Rev. No. 0

Accepted By:

*S. J. Trent*  
S. J. Trent, Project Scientist  
WHC Geosciences

10/30/90  
Date

---

## HAZARDOUS WASTE OPERATIONS PERMIT

KAISER ENGINEERS  
HANFORD COMPANY

PROJECT 200-BP-1, 299-E33-38, -39, & -40

Page 3 of 35

---

Rev. No. 0

### 2. Project Description:

#### Background

The 200-BP-1 Operable Unit is a group of individual waste management units grouped for their similarities in types of waste received, construction, and/or geographical proximity. The Operable Unit contains 10 cribs and 3 unplanned release sites. Seven of the cribs (216-B-43 through 216-B-49) received waste generated in U-Plant during uranium recovery operations from tanks (first cycle tributyl phosphate [TBP] supernatant) from 1954 to 1957. These cribs had a service life ranging from 1 to 20 months. Two of the cribs (216-B-50 and 216-B-57) received condensate from in-tank solidification units (ITS) in 241-BY Tank Farm and operated from 1965 to 1974. One crib (216-B-61) has no records of being used. The three unplanned releases were associated with tank farm operations at the 241-BY Tank Farm. A french drain in the 200-BP-4 Operable Unit is near one of the planned wells (299-E33-39). This waste management unit received waste similar to the TBP supernatant (flushes from the crib discharge line), but a comparatively smaller volume. The 216-B-51 French Drain operated from 1956 to 1958. In addition to the cribs and unplanned releases, several inactive pipelines that were associated with tank farm operations are located within the 200-BP-1 Operable Unit.

#### Purpose

The purpose of this project is to install three groundwater monitoring wells (299-E33-38, -39, and -40) in the vicinity of the BY Cribs in the 200-BP-1 Operable Unit. These wells will be used to obtain geologic, chemical, and hydraulic data to be used in the characterization of the Operable Unit. The data will be used to delineate contaminant plumes (vadose and unconfined aquifer) emanating from sources within the operable unit; determine potential future migration of contamination, determine the types and concentrations of contaminants, and determine properties and characteristics of the unsaturated and saturated zones.

### 3. Location:

The 299-E33-38 well is about 50 ft south of the 216-B-47 Crib in the 200-BP-1 Operable Unit which is located in the northern portion of the 200 East Area. The 299-E33-40 well is located about 100 ft to the northwest of the 216-B-50 Crib. The 299-E33-39 well is located approximately 150 ft east of the 200-BP-1 Operable Unit and about 60 ft north

---

---

## HAZARDOUS WASTE OPERATIONS PERMIT

**KAISER ENGINEERS  
HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

**Page 4 of 35**

---

---

**Rev. No. 0**

of the 216-B-51 French Drain. Figures 1 and 2 present the location of the 200-BP-1 Operable Unit relative to the Hanford site and a detailed map of the Operable Unit, respectively. The three well locations are indicated in Figure 2.

#### **4. Facility/Work Site Description:**

The well site locations are desert terrain typical of the Hanford Site. Before drilling operations begin, the drill sites will be prepared by covering an area for the Exclusion/Contamination Reduction Zones and access roads with gravel. The well sites are located within a Radiation Zone with both surface and possible subsurface contamination. The hazards are discussed further in Section 6 through 12 and in the Radiation Work Permit (RWP) Number SS-KEH-038.

A cable tool drilling rig will be used to drill wells to the desired estimated depth. The wells will be completed with stainless steel casing and screen. The 299-E33-40 well will be completed in the Rattlesnake Ridge Confined Aquifer at about 330 ft, and the 299-E33-38 and 299-E33-39 wells will be completed in the unconfined aquifer at about 240 ft. A typical well completion diagram for an unconfined aquifer well and a confined aquifer well are presented in Figure 3 and Figure 4, respectively.

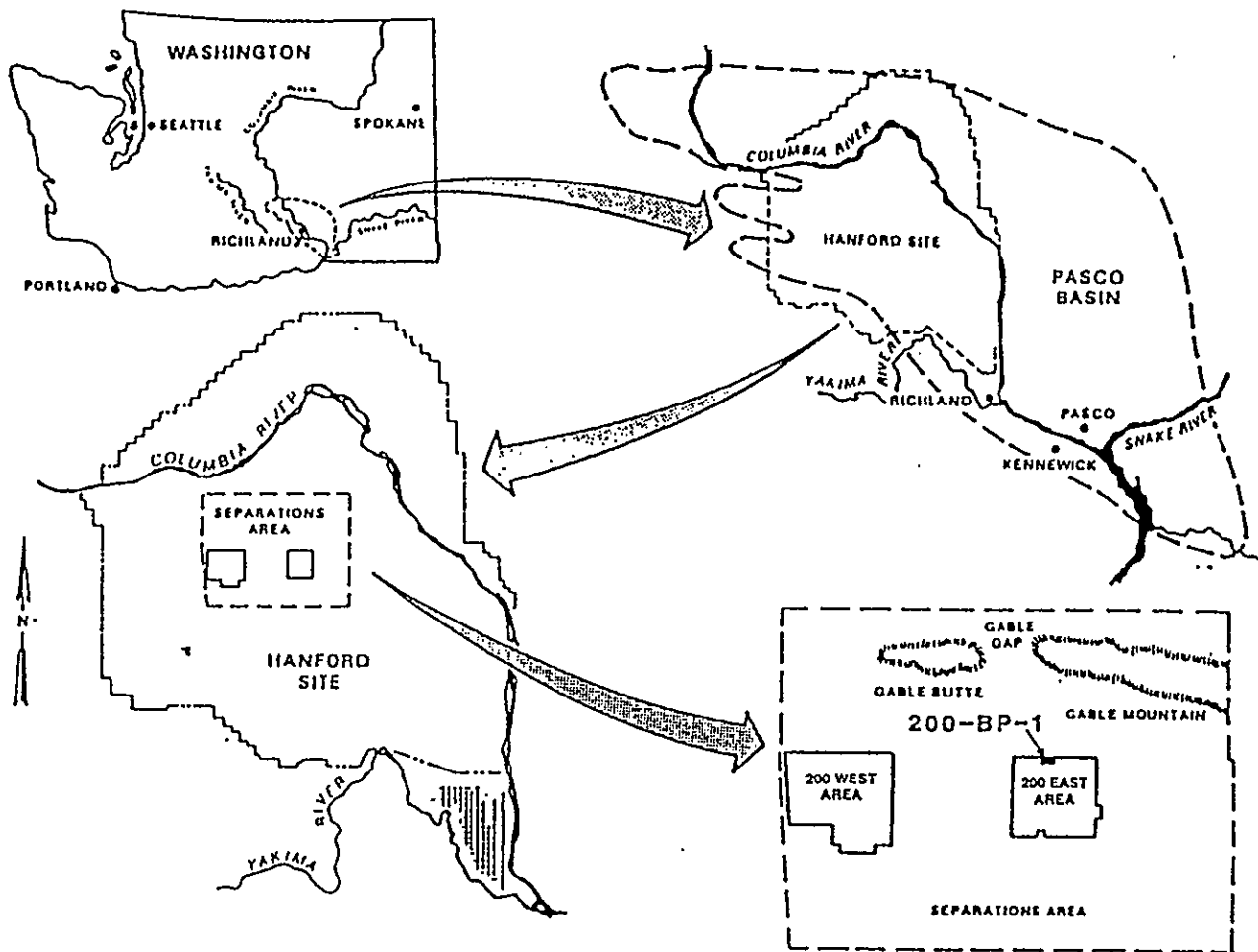


Figure 1. Separations Area Location Map.

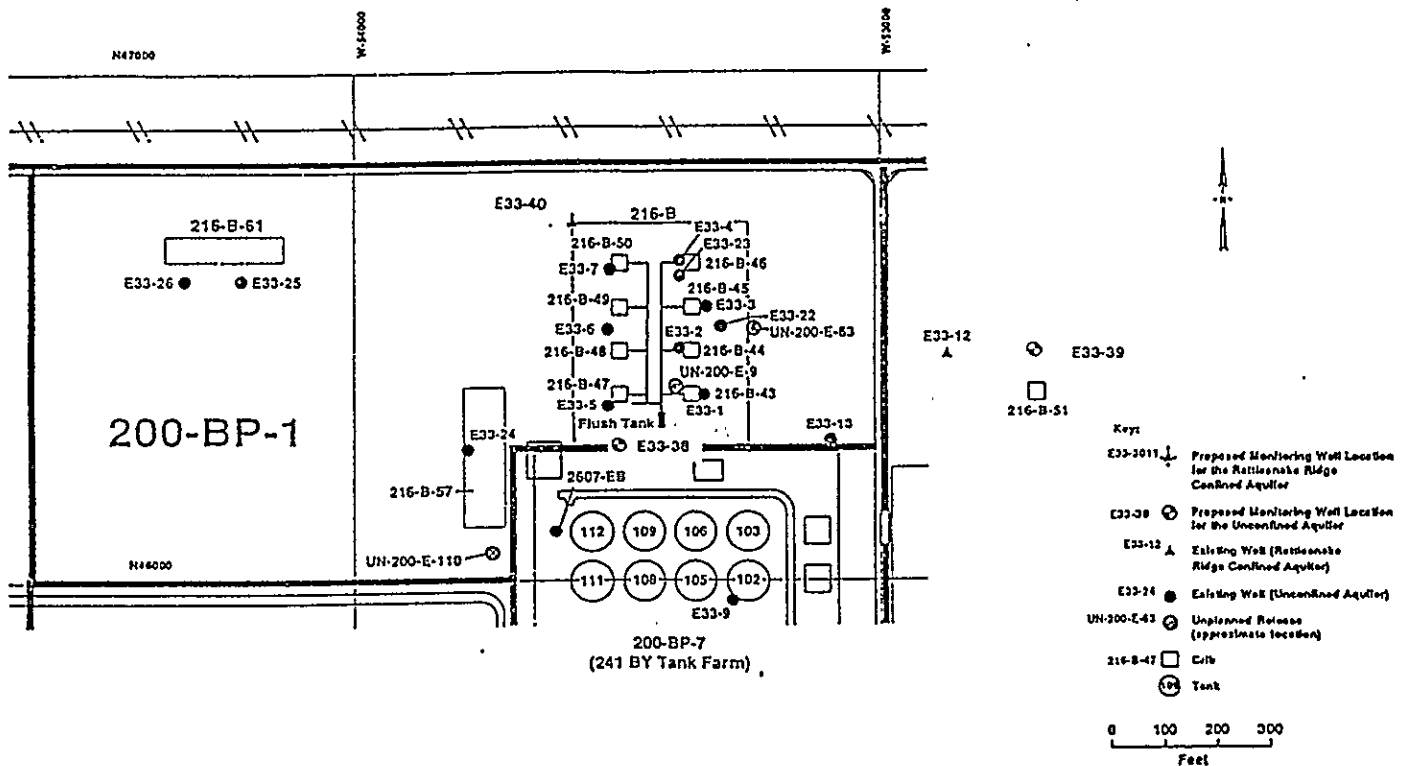


Figure 2. Structures Within the 200-BP-1 Operable Unit.



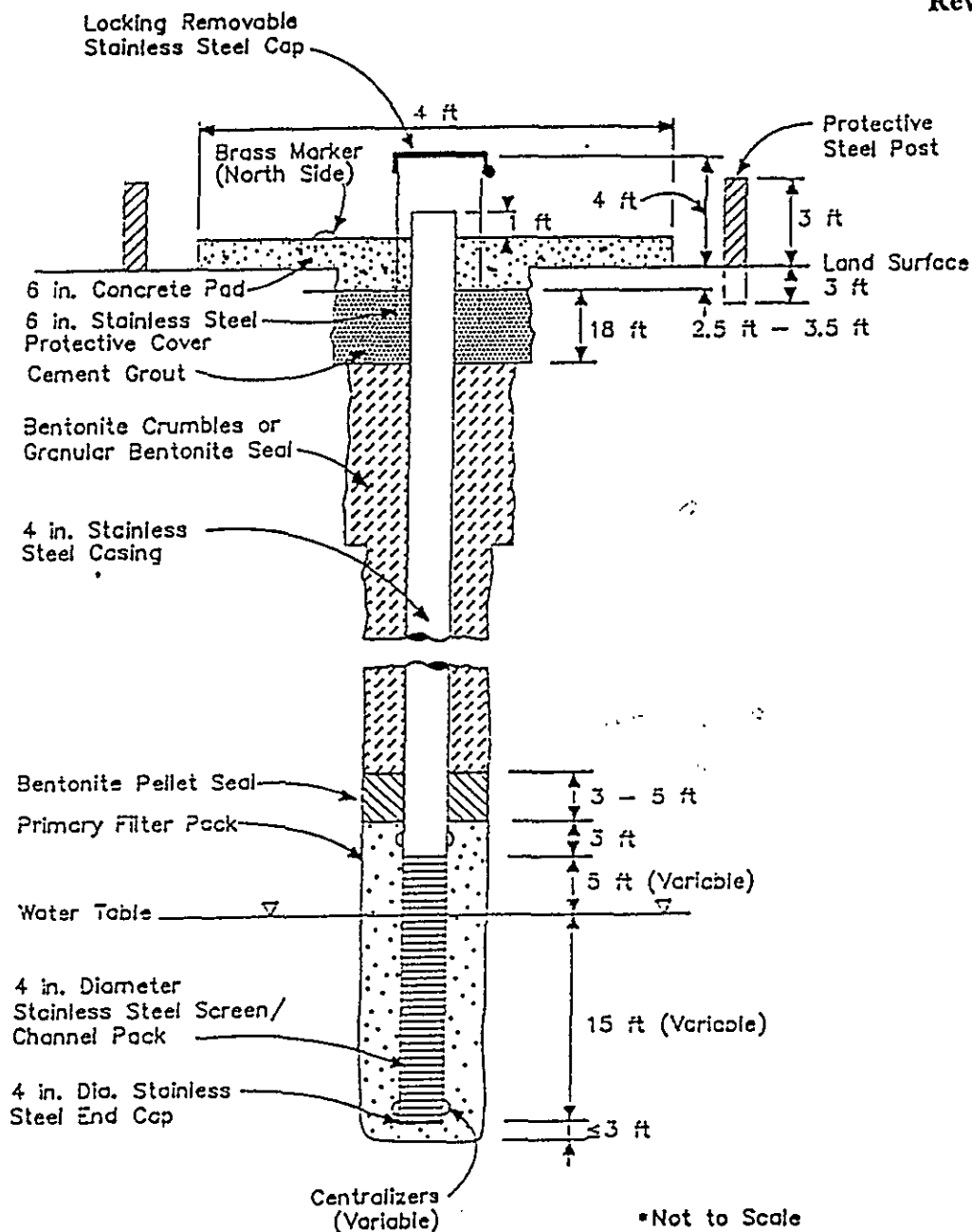


Figure 3. Schematic Diagram of a Typical Shallow Groundwater Monitoring Well Completion

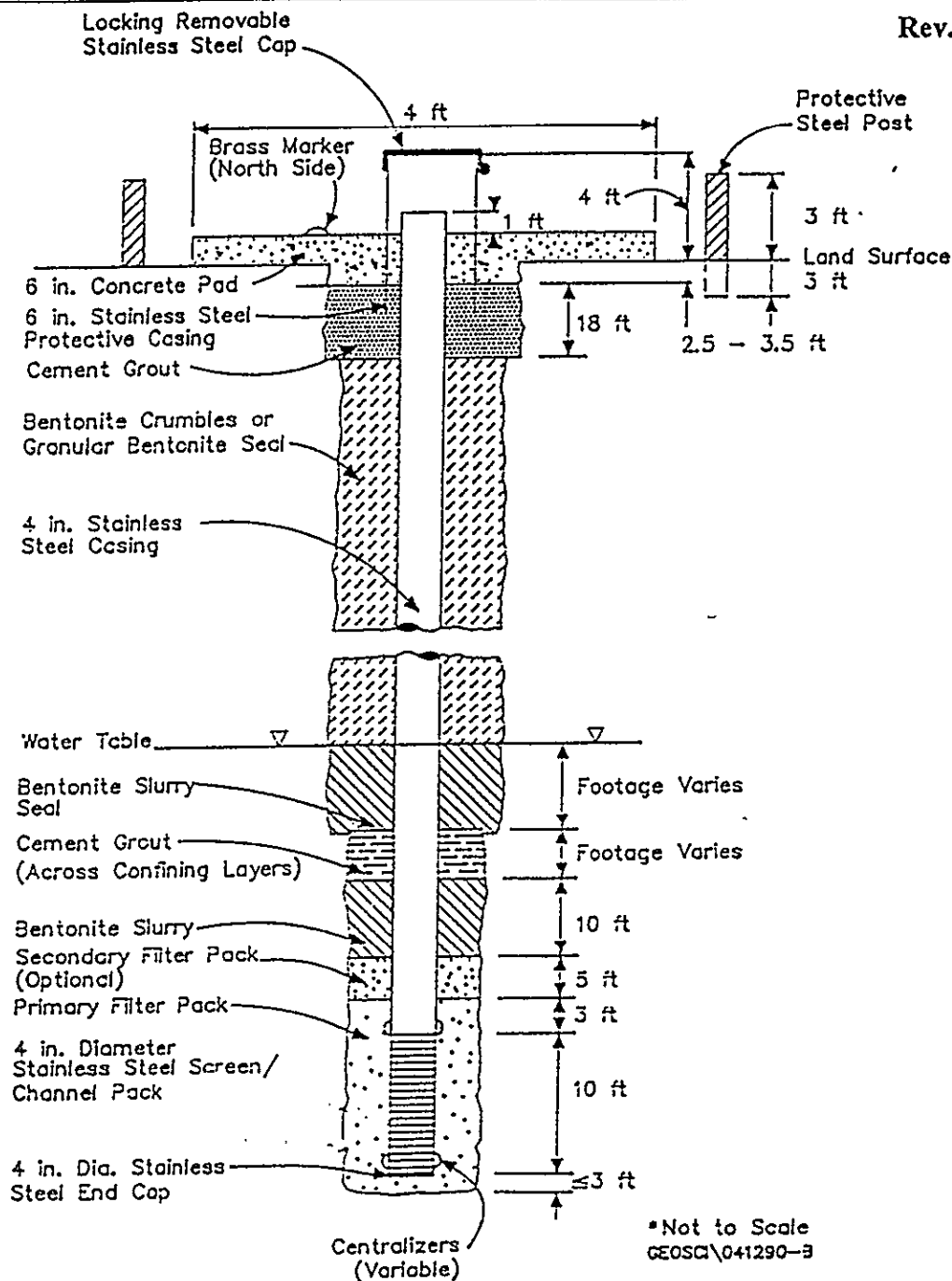


Figure 4. Schematic Diagram of a Typical Deep Groundwater Monitoring Well Completion

---

---

**HAZARDOUS WASTE OPERATIONS PERMIT**

**KAISER ENGINEERS**  
**HANFORD COMPANY**

**PROJECT** 200-BP-1, 299-E33-38, -39, & -40

Page 9 of 35

Rev. No. 0

**5. Proposed Personnel and Job Functions:**

Project Coordinator M. A. Buckmaster, WHC  
Field Team Leader J.A. Bultena/J.M. Jiminez, WHC (Drilling); D.C. Weekes (Completion)  
Project Engineer B. A. Gilkeson, WHC  
Superintendent J. A. Curl, KEH  
Safety Supervisor S. R. Turney, KEH

<u>Proposed Field Team</u>	<u>Job Function</u>
D.A. Lamar/T.J. McLaughlin	Site Safety Officer
To be determined by KEH	Drillers
To be determined by KEH	Craft Manpower
S. Kos/J.W. Roberts/G. Kelty/K. Hoffmann	Geologist
W.S. Thompson/J.W. Roberts/S.M. Loftus	Sampling Scientist
C.S. McClellan/S.M. Steele/R.Z. Steffler	Sampling Technicians
HPT Pool	Health Physics Technician

**6. Confined Space Entry**

Will this task require entry into any  
confined or partially confined space?

☐ Yes - Describe below  
☒ No

**7. Cutting and Welding**

Will this task involve use of a cutting  
torch or welding?

☒ Yes - Describe below  
☐ No

---

---

## HAZARDOUS WASTE OPERATIONS PERMIT

KAISER ENGINEERS  
HANFORD COMPANY

PROJECT 200-BP-1, 299-E33-38, -39, & -40

Page 10 of 35

---

---

Rev. No. 0

### 8. Other Potential Hazards

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Chemical                       | <input checked="" type="checkbox"/> Trips, Slips, Falls               |
| <input checked="" type="checkbox"/> Radiological                   | <input type="checkbox"/> Trenching/Shoring                            |
| <input checked="" type="checkbox"/> Fire/Explosion                 | <input checked="" type="checkbox"/> Heavy Equipment/Vehicular Traffic |
| <input checked="" type="checkbox"/> Heat Stress                    | <input checked="" type="checkbox"/> Overhead Hazards                  |
| <input type="checkbox"/> Electrical                                | <input type="checkbox"/> Unstable/Uneven Terrain                      |
| <input checked="" type="checkbox"/> Machinery/Mechanical Equipment | <input checked="" type="checkbox"/> Other - Describe Below            |

### 6,7,8 Description/Other

7. Installation of each well will require the use of an acetylene cutting torch and an arc welder for cutting and welding casing strings as drilling proceeds. Welders safety goggles, leather jacket, and leather gloves are required during cutting and welding operations. The borehole will be monitored for combustible gases using an LEL detector prior to cutting, welding operations, or other spark producing activity. The necessary permits will be in place prior to welding.
8. **Chemical:** The chemicals known to be have been disposed in the Operable Unit are listed in Table 1. The 216-B-51 French Drain (near the 299-E33-39 well) received waste with a similar composition to that disposed in the 200-BP-1 Operable Unit, but in smaller volumes and lower concentrations. No ferrocyanide was documented to have been disposed in the 216-B-51 French Drain. In addition to these contaminants, other contaminants have been detected at levels above the analytical detection limits in the groundwater from existing monitoring wells within the vicinity of the Operable Unit. These contaminants include: cyanide, fluoride, chloride, iron, lead, arsenic, mercury, manganese, vanadium, zinc, chromium, barium, selenium, and copper. Section 9 discusses the potential hazards posed by selected contaminants from those listed in Table 1 and above. These contaminants are selected based on the degree of potential hazard.

**Radiological:** The radioisotopes that may exist at the well site are listed in Section 22 and Table 2. Estimated quantities of these isotopes disposed in the Operable Unit are also listed in Table 2. Although, the 216-B-51 French Drain received similar waste to that disposed in the 200-BP-1 Operable Unit, their is no estimated radionuclide inventory available. The potential hazards posed by these radioisotopes and their mitigation are found in Sections 19 through 23, and the SS-KEH-038 RWP. The well sites are located within a Surface Contamination Area. Gravel will be placed over the current grade to stabilize any surface contamination within the Exclusion Zone and on access roads prior to the initiation of drilling.

---

---

**HAZARDOUS WASTE OPERATIONS PERMIT**

**KAISER ENGINEERS  
HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

**Page 11 of 35**

---

---

**Rev. No. 0**

Table 1. Estimated Quantities of Chemical Discharged to Cribs in 200-BP-1 Operable Unit

<u>Constituent</u>	<u>Quantity (kg)</u>
Sodium	2,650,500
Nitrate	6,501,500
Sulfate	469,000
Phosphate	332,000
Ferrocyanide	18,900
Ammonium nitrate	10,000
Ammonium carbonate	21,000
Tributyl phosphate	Trace
Paraffin hydrocarbons	Trace

Table 2. Estimated Quantities of Radionuclides Discharged to Cribs in  
200-BP-1 Operable Unit

<u>Constituent</u>	<u>Quantity (Ci)</u>
$^3\text{H}$	2,499
$^{90}\text{Sr}$	6,054
$^{137}\text{Cs}$	2,092
$^{60}\text{Co}$	0.449
$^{99}\text{Tc}$	unknown
$^{106}\text{Ru}$	0.00009
$^{238}\text{U}$	0.1806
$^{239}\text{Pu}$	4.0457
$^{240}\text{Pu}$	1.0918
Total Alpha	< 0.000005
Total Beta	16,179.2

---

---

## HAZARDOUS WASTE OPERATIONS PERMIT

KAISER ENGINEERS  
HANFORD COMPANY

PROJECT 200-BP-1, 299-E33-38, -39, & -40

Page 12 of 35

---

---

Rev. No. 0

**Fire/Explosion:** A small potential of fire and/or explosion exists as the result of contacting pockets of flammable gases or vapors during drilling operations. This potential will be mitigated by monitoring the borehole and vicinity for combustibles using an LEL detector.

**Heat Stress:** KEH has designated the drilling of groundwater monitoring wells as light to moderate work load. If the temperature at the site exceeds 80 °F, site personnel shall be assessed for heat stress by monitoring wet bulb globe temperature index. If based on guidelines prescribed in most recent edition of the TLV booklet published by the ACGIH, a work-rest regimen is indicated, it will be implemented by the SSO as indicated in the ACGIH booklet. Drinking water will be provided in the support zone. Engineering controls such as solar shielding will be applied as necessary and when they are applicable.

**Cold Stress:** Appropriate measures shall be implemented to prevent the core body temperature of the workers from falling below 36 °C (96.8 °F). If the temperature at the site is below 16 °C (60 °F) the SSO will monitor the temperature, when the temperature is below -1°C (30°F) the wind speed shall be monitored with the temperature to allow determination of chill temperature. Adequate insulating clothing will be provided if the air temperature is below 4°C (40°F). A work-warming regimen will be implemented as prescribed in the ACGIH booklet. Workers shall be warned of dangers of touching exposed metal surfaces with bare skin when temperatures are below about -7°C (20°F). Care shall be taken to prevent workers from getting wet or spilling other liquids such as gasoline on themselves. Wind shielding should be used when applicable to raise the chill temperature.

**Machinery/Mechanical Equipment:** The cable tool drilling rigs being used to drill the wells potentially exposes workers to pinch points. All equipment guards must be in place on the drilling rig and support equipment. Personnel must be made aware of potential pinch points so that they can be avoided. Drilling equipment will be inspected regularly and all safety devices must be in place and in working order. Personnel shall get help when lifting heavy equipment and tools or use a mechanical lifting device. All required safety equipment must be worn when machinery is operating and personnel are within the bounds of the exclusion zone.

**Trips, Slips, Falls:** Good house keeping practices must be followed to reduce clutter at the site. This will help reduce the risks of trips, slips, and falls. Plan routes in and around the site to avoid tripping hazards.

---

## HAZARDOUS WASTE OPERATIONS PERMIT

KAISER ENGINEERS  
HANFORD COMPANY

PROJECT 200-BP-1, 299-E33-38, -39, & -40

Page 13 of 35

---

Rev. No. 0

**Overhead Hazards:** A cable tool drilling rig presents potential overhead hazards. To help mitigate these hazards do not lift material directly overhead of personnel. When extracting tools from the borehole or retrieving casing or tools via the cable, site personnel will alert the driller of their presence and stand clear until operations have ceased. Safety equipment such as hard hats must be worn at all times.

**Other/Noise:** Noise poses a serious health and safety hazard during the installation of groundwater monitoring wells. This hazard is especially serious during the driving and backpulling of casing. The exclusion zone will be labeled as "Hearing Protection Required when equipment is Operating" with protective devices available onsite. Hearing protection shall be worn when equipment is operating or drilling is in progress.

**Other/Biological Hazards:** The Hanford Site has several native animal species that can pose a potential hazard to workers. These include rattlesnakes, black widow spiders, brown recluse spiders, and scorpions. Personnel should be alert when working near cool and shaded areas. Materials stored onsite may offer perfect hiding places for these animals. Therefore, workers should exercise caution when using or moving materials such as well casing, coveralls, and packaged materials.

---

### 9. Chemical/Radiological Hazard Evaluation

Waste Media	Hazardous Characteristic
<input checked="" type="checkbox"/> Airborne Contamination	<input checked="" type="checkbox"/> Ignitable
<input checked="" type="checkbox"/> Surface Contamination	<input type="checkbox"/> Corrosive
<input checked="" type="checkbox"/> Contaminated Soil	<input type="checkbox"/> Reactive
<input checked="" type="checkbox"/> Contaminated Groundwater	<input type="checkbox"/> Explosive
<input type="checkbox"/> Contaminated Surface Water	<input checked="" type="checkbox"/> Toxic (non-radiological)
<input checked="" type="checkbox"/> Solid Waste	<input checked="" type="checkbox"/> Radioactive
<input checked="" type="checkbox"/> Liquid Waste	
<input type="checkbox"/> Sludge	

#### Substance

This task will involve the reasonable possibility of exposure to the substances listed below at concentrations or in quantities which may be hazardous to the health of the site personnel.

**HAZARDOUS WASTE OPERATIONS PERMIT**  
**KAISER ENGINEERS**  
**HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**  
**Page 14 of 35**

**Rev. No. 0**

Primary Hazard (Rate: neg, low, mod, high, ext)

<u>Substance</u>	<u>Inhalation of :</u>		<u>Ingestion</u>	<u>Dermal Absorption of:</u>				<u>Reactivity/ Explosion</u>
	<u>Gases/ Vapors</u>	<u>Dust/ Mist</u>		<u>Solid/ Liquids and/or Skin Contam.</u>	<u>Gases/ Vapors</u>	<u>Corrosive Irritant</u>	<u>Ignit- ability</u>	
Cyanides (HCN, NaCN, ferrocyanide ion)	mod		low	mod	mod	neg	low	neg
Ammonia	mod		low	low	low	mod	low	low
Tributyl Phosphate	neg-low		low	low	neg	low	low	neg
Dibutyl Phosphate	neg-low		low	low	neg	low	low	neg
Paraffin Hydrocarbon	low		low	neg	neg	neg	low	neg

<u>Substance</u>	<u>PEL/TLV</u>	<u>STEL</u>	<u>IDLH Level</u>	<u>Health Effects</u>
HCN	10 ppm <sup>1</sup>	4.7 ppm	50 ppm	CNS, CVS; liver, kidney; weakness, headache, confusion, nausea, vomiting, increased respiration rate
Ammonia	25 ppm	35 ppm	500 ppm	Eye, nose, throat irritation; bronchospasm; chest pain
Tributyl Phosphate	0.2 ppm	--	120 ppm	Eye, respiratory, skin irritant; headache; nausea
Dibutyl Phosphate	1 ppm	2 ppm	125 ppm	Respiratory irritant; headache; skin, eye, nose irritant

<sup>1</sup> TLV Ceiling Limit



**HAZARDOUS WASTE OPERATIONS PERMIT**

**KAISER ENGINEERS**  
**HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

Page 15 of 35

Rev. No. 0

<u>Substance</u>	<u>PEL/TLV</u>	<u>STEL</u>	<u>IDLH Level</u>	<u>Health Effects</u>
Paraffin Hydrocarbon (Stoddard Solvent [kerosene])	100 ppm; 525 mg/m <sup>3</sup>	--	5000 ppm	Dizziness, drowsiness, headache, nausea, eye, nose, throat irritant, dry cracked skin

**10. Ambient Air/Site Monitoring Procedures**

The following instruments shall be used to monitor the work environment and worker's breathing zones prior to site entry and at the specified intervals.

Instrument		Monitoring Frequency				
<u>X</u>	PID (Portable Gas Analyzer [PGA]) w/10.6 eV lamp	Cont.	15 min.	30 min.	<u>hourly</u>	<u>other See 1</u>
<u>  </u>	OVA (optional)	Cont.	15 min.	30 min.	hourly	other <u>  </u>
<u>X</u>	Combustible Gas Analyzer	Cont.	15 min.	30 min.	hourly	<u>other See 2</u>
<u>  </u>	H <sub>2</sub> S Detector (optional)	Cont.	15 min.	30 min.	hourly	other <u>  </u>
<u>X</u>	Colorimetric Detector Tubes (list types of tubes below)	Cont.	15 min.	30 min.	hourly	<u>other See 3</u>
<u>X</u>	pH Paper	Cont.	15 min.	30 min.	hourly	<u>other See 4</u>
<u>  </u>	Other	Cont.	15 min.	30 min.	hourly	other <u>  </u>

Other:

1. PGA monitoring will be performed every hour while drilling is in progress. Monitoring of the borehole will also be performed at the start of each day and after all breaks and lunch. If a positive reading is observed, the monitoring frequency will be increased to continuous, until levels fall to background or until an action level is reached. Additionally all materials removed from the well will be monitored.
2. The borehole will be monitored for combustible gas before cutting, welding, or other spark producing activity is performed. The borehole will also be monitored at the beginning of each day or at any time the borehole is covered for more than 1 hour.

---

**HAZARDOUS WASTE OPERATIONS PERMIT**  
**KAISER ENGINEERS**  
**HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

**Page 16 of 35**

---

**Rev. No. 0**

3. HCN colormetric detector tube: Monitor the borehole before daily drilling operations begin, when changes lithology are encountered, and/or when encountering aquifers. Additionally, all cuttings and samples will be monitored.

Ammonia colormetric detector tube: If the odor of ammonia is detected by site personnel hourly monitoring is required, otherwise the same monitoring requirement used for HCN is dictated.

Stoddard solvent colormetric detector tube: same monitoring requirements as HCN

4. Check the pH of all perched water encountered (if any), soils at changes in lithology, and groundwater when the aquifer is encountered. If hard tooling is required, the pH of the hard tool cuttings shall be checked. The water that is introduced to the borehole for hard tooling shall be checked to establish a baseline for the subsequent pH measurements.

---

**11. Personal Monitoring**

☐ Passive Dosimeter      ☐ Personal Air Sampling      ☒ Other

Description/Other: As requested by SSO (performed Hanford Environmental Health Foundation [HEHF]).

**12. Biological Monitoring/Medical Surveillance**

- ☒ This project requires medical surveillance or biological monitoring procedures beyond the provisions of the routine medical surveillance program (see description below).

Description: Each team member will be participate in the medical surveillance program through HEHF. In addition to the routine medical surveillance program, SS-KEH-038 RWP requires that site personnel under go urinalysis testing to monitor for potential radionuclide exposure.

---

---

**HAZARDOUS WASTE OPERATIONS PERMIT**

**KAISER ENGINEERS**  
**HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

Page 17 of 35

---

Rev. No. 0

**13. Action Levels**

Field team personnel shall observe the following Action Levels:

<u>Instrument</u>	<u>Action Level</u>	<u>Specific Action</u>
PGA w/10.6 eV lamp	5 ppm above background for 3 minutes in the breathing zone downwind of the borehole	Evacuate Exclusion Zone up wind from the borehole. The SSO will upgrade to level B and initiate measures to identify the cause of the elevated readings. This identification effort should include monitoring with colormetric tubes such as Stoddard Solvent. Engineering and administrative controls will be assessed before personnel are upgraded to level B protection.
Colormetric tubes	Positive reading of 3 ppm HCN, 10 ppm ammonia, or 130 mg/m <sup>3</sup> (25 ppm) stoddard solvent in the breathing zone downwind of the borehole.	Evacuate the Exclusion Zone assuring that personnel are up wind of the borehole. If HCN was detected, operations will cease. A gas sample will be obtained per the "Air Quality Sampling of Ambient and Downwind Air at Waste Sites" procedure while in level B PPE. Based on the laboratory results, the potential hazards will be reassessed. If NH <sub>3</sub> concentration is > action level but < 75 ppm, assure level C PPE and increase monitoring frequency to 15 min. For concentrations > 75 ppm stop operations and reevaluate the situation. If stoddard solvent is detected assure level C PPE and increase the monitoring frequency to 15 min.

---

---

**HAZARDOUS WASTE OPERATIONS PERMIT**

**KAISER ENGINEERS  
HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

**Page 18 of 35**

---

---

**Rev. No. 0**

<u>Instrument</u>	<u>Action Level</u>	<u>Specific Action</u>
Combustible Gas Analyzer	10% LEL	Cease welding, cutting or other spark producing activities within 10 ft of borehole until levels fall below 10%. Implement measures to identify causal substance.
pH paper	< pH 4 or > pH 10	Evaluate current level of PPE. Do not bring any more materials to the surface or contact any of the materials until evaluation is completed. Change PPE as necessary.

NOTE: If any reading above background is detected, the SSO will increase the sampling frequency and reevaluate the current level of PPE. Work shall continue unless the SSO deems otherwise.

#### **14. Onsite Control**

Control boundaries have been established, and the Exclusion Zone, Contamination Control Zone and Support Zone have been designated and are identified as follows:

Exclusion Zone: The Exclusion Zone is the inner area of the drilling site, identified with yellow rope. For this project three exclusion zones will be established, one for each well site. These zones are established to control gross contamination. Materials and tools contacting soil from the borehole shall be decontaminated prior to leaving the zone or bagged prior to being sent to a decontamination facility. Only individuals that meet the training requirements designated in Section 25 are allowed in this zone.

Contamination Reduction Zone (CRZ): This is the zone surrounding each of the Exclusion Zones. Its purpose is to act as buffer to administratively control the spread of contamination. A corridor within the Contamination Reduction Zone is provided for access in and out of the Exclusion Zone. In this corridor, personnel and equipment will be decontaminated before entering the Radiation Control Zone (i.e., the gravel access roads). While in the CRZ the minimum level of protection will be that required in the

**Exclusion Zone.** The Contamination Reduction Zone is delineated by a roped off area. This rope will be 5 to 20 ft from the Exclusion Zone boundary. This boundary rope is designated as the Contamination Control Line.

**Decontamination Corridor:** All access into the Exclusion Zone will be through the Decontamination Corridor. Inside the corridor is where the decontamination stations will be located to decontaminate personnel and equipment, and/or bag materials for shipment to decontamination facilities or analytical laboratories for analysis. Personnel in this corridor shall at a minimum be in the same level of protection required in the Exclusion Zone. The corridor will be upwind of the drill rig based on prevailing wind direction. Signs will be placed at the entrance as required (e.g., "Hearing Protection Required").

**Radiation Control Area (RCA):** The gravel access roads constructed within the Surface Contamination Area will be designated as a RCA. These areas will be maintained as clean areas allowing easy access to the drill sites by workers and support personnel. Radiation surveys will be performed daily to assure these areas remain uncontaminated. Equipment and personnel leaving the CRZ will be decontaminated to control the spread of contamination into the RCA. A step off pad will be used for entering/exiting the Radiation Control Area from the CRZ. Before final release into the Support Zone, a final HPT survey will be performed.

**Support Zone:** The Support Zone, which will be located upwind (based on prevailing wind direction) of the Surface Contamination Area when possible, will support operations within the Exclusion Zones. A trailer will be located within this Zone for dressout, breaks, and lunch. A wind sock will be located in the Support Zone to indicate the direction and speed of the wind. For the 299-E33-39 well it may not be possible to locate the Support Zone directly upwind of the Exclusion Zone. If the Support Zone can not be located directly upwind, the FTL, SSO, and HPT will evaluate a different location that is not in a direct down-wind line of the 299-E33-39 well site (based on prevailing wind direction).

**Surface Contamination Area:** The Surface Contamination Area currently existing and surrounding the drill sites will not be changed for this project, but a clean access will be provided via the Radiation Control Area as previously described.

**Command Post:** A Command Post will be set up in the Support Zone. All operations will be directed from this post. The post will be located upwind from the Exclusion Zone (if possible) based on the prevailing wind direction.

JA Bultena/JM Jiminez (drilling) and DC Weekes (completion) have been designated to coordinate access control on the work site during this task. No unauthorized person shall be allowed beyond the Exclusion Zone. Personnel requiring entry into the exclusion zone must notify the SSO and comply with all health and safety regulations.

Each team member working within the Exclusion Zone will be assigned a buddy. Team members must remain within line of sight of their assigned buddy or delegate another team member. Team members will monitor each other for symptoms of exposure to hazardous substances or other safety related situations such as cold stress, defective safety equipment, etc.

**Environmental protection and response** will be implemented and addressed as follows. At each well site, the area occupied by the drill rig will be covered with a heavy mil plastic or an equivalent to prevent soil contamination. Frequent inspections will be conducted under and around equipment to identify leaks. When large leaks are observed, the equipment will be shut down until the necessary repairs are made.

When contamination of earth or liquid is suspected or known, all tainted material will be placed on impermeable plastic or containerized until the extent of contamination is determined, and/or disposal of this material is specified by WHC Regulatory Assessment and concurred by KEH Environmental Restoration and Environmental Compliance. It is the responsibility of the SSO to notify KEH Environmental Restoration immediately in the event of a release to the environment or the encountering of contaminated spoils. Potential contaminants from the well include purge water, and spoils. Contaminants from drilling equipment include lubricating grease, oil, anti-freeze, and gasoline. Substantial spills of contaminated or hazardous material may require response by the Hanford Fire Department Haz-Mat Emergency Response Team.

All materials that produced from well drilling activities (cuttings, spoils, fluids, etc.) shall be periodically monitored with field instrumentation for volatile organic compounds, radiological, and other constituents known or suspected to be at the site or associated with well installation. Containment, preferably in a 55-gallon drums, shall occur if any of the following conditions are present:

- (1) field instruments detect and confirm radiological or chemical contamination in the borehole or spoils;
- (2) encountering perched or groundwater, moist or saturated soil;
- (3) pH values less than 4 or greater than 10 units; or

---

---

**HAZARDOUS WASTE OPERATIONS PERMIT**

**KAISER ENGINEERS  
HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

**Page 21 of 35**

---

---

**Rev. No. 0**

- (4) when spoils are being removed that contain known chemical, radiological, or mixed wastes, regardless of indication from field instruments. Suspected contaminants that may be encountered will be contained.

To preclude the drumming of non-hazardous materials, the following conditions should be evaluated to determine if the source of contamination is actually from the borehole. Monitoring for fugitive or operational emissions, checking instrument sensitivity, confirming the presence of lubricants, checking for residual on casing/equipment from prior wells, and other site-to-site specifics. When the cumulative data shows that the source is the well, a decision will be rendered to following drumming procedures. This decision will be periodically reviewed to reverify or terminate the need to continue such practices.

Purge waters collected by the pump truck during well development, will be disposed of at specially constructed settling ponds, i.e. Mod-u-tank.

**15. Personal Protective Equipment**

Location	Job Function/Task	Initial Level of Protection
Contamination Control Zone	<u>Support - Decontamination</u>	B <u>C</u> D
Exclusion Zone	<u>Drilling, bailing, sampling</u>	B <u>C</u> D
Support Zone	<u>Support onsite work.</u> <u>Mobilization and</u> <u>demobilization</u>	B C <u>D</u>

Rational:

The proximity to the BY Cribs and the 216-B-51 French Drain increase the potential that contaminated sediments may be contacted during drilling operations and become airborne. Therefore, respiratory protection is warranted during operations.

If based on monitoring by the HPT and the SSO it is deemed that the current level of PPE is not required to assure the safety of site workers, the level of PPE may be down graded. The reasoning for this down grade must be documented in the site safety log book and by completing the Field Procedures Change Authorization form, Section 29 of this HWOP.

**HAZARDOUS WASTE OPERATIONS PERMIT**  
**KAISER ENGINEERS**  
**HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**  
**Page 22 of 35**

**Rev. No. 0**

List the specific protective equipment and material (where applicable) for each of the Levels of Protection identified above:

**Level B**

☒ Pressure demand airline  
☐ Pressure demand airline  
with escape provisions  
☐ Pressure demand SCBA  
☒ Full Body Saranex Coveralls  
☒ Plus Level D protection  
☒ Additional hand protection  
as required

**Level C**

☐ Half-face Air Purifying Respirator  
☒ Full-face Air Purifying Respirator  
☐ Full-face canister Air Purifying  
Respirator  
☒ Plus Level D protection

**Level D**

Hard hat  
Steel-toe boots  
Eye protection w/side shields  
Hearing protection  
Inner latex or PVC  
Outer canvas gloves  
SWP's as stated in RWP

Where air purifying respirators are authorized, HEPA/organic vapor/acid gas are the appropriate canister/cartridges for use with the specific substances and concentrations anticipated. All respiratory protection will meet the requirements of Kaiser Engineers and Westinghouse Hanford respiratory protection manuals.

**NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE  
MADE WITHOUT THE KNOWLEDGE AND APPROVAL OF THE HEALTH  
AND SAFETY OFFICER, SITE SAFETY OFFICER, AND HEALTH PHYSICS  
TECHNICIAN.**



---

---

**HAZARDOUS WASTE OPERATIONS PERMIT**

**KAISER ENGINEERS**  
**HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

Page 23 of 35

---

---

Rev. No. 0

**16. Decontamination**

Personnel and equipment leaving the Exclusion Zone shall proceed through the following decontamination stations and procedures:

**Personnel Decontamination**

<u>Station</u>	<u>Procedure</u>
1. Rubber boot drop	1. Discard rubber boots as required
2. Outer glove drop	2. Discard gloves as required
3. Outer coverall drop	3. Discard outer coverall as required
4. Respirator drop	4. Remove respirator and discard cartridges (if applicable)
5. Inner glove drop	5. Discard inner gloves
6. HPT Survey	6. HPT will survey personnel
7. Final wash	7. Wash hands and face with warm-soapy water followed by a rinse in clean water

The following decontamination equipment is required:

Wash tubs  
Plastic ground covering  
Brushes and wipes  
Plastic bags  
Non-phosphate soap  
Pump and hose  
Towels  
Potable water supply

---

---

**HAZARDOUS WASTE OPERATIONS PERMIT**

**KAISER ENGINEERS  
HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

**Page 24 of 35**

---

---

**Rev. No. 0**

Emergency decontamination procedures:

Serious injury or illness to site workers take precedence over decontamination procedures. If injury or illness is not severe enough to warrant no decontamination, decontaminate the individuals as required taking care not to aggravate injury.

---

**17. Confined Entry Procedures    X Not Applicable**

---

**18. Cutting/Welding Procedure    \_\_\_\_ Not Applicable**

Yes N/A

X \_\_\_\_ Relocate or Protect Combustibles

\_\_\_\_ X Wet Down or Cover Combustible Floor

X \_\_\_\_ Check Flammable Gas Concentrations (% LEL) in air

\_\_\_\_ X Cover Wall, Floor, Duct, and Tank Openings

X \_\_\_\_ Provide Fire Extinguisher

Other Special Instructions:

---

---

---

**HAZARDOUS WASTE OPERATIONS PERMIT**

**KAISER ENGINEERS  
HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

**Page 25 of 35**

**Rev. No. 0**

---

**19. Radiological Conditions**

Contamination Potentials      Exposure Rates Expected Average/Maximum:  
(Rate-neg, low, med, HIGH, ext) Ave.  $\leq$  0.5 mrem/hr  
Max. 250 mrem/hr

X Alpha   X Beta/Gamma   X Beta   X Gamma      Neutron

Smearable/Fixed:      Whole Body/Extremity:  
< 1,000,000 dpm/probe area      Ave.  $\leq$  0.5 mrem/hr  
Beta/Gamma      Max. 250 mrem/hr  
< 1,000 dpm/probe area Alpha

---

**20. Health Physics Technician Coverage**

   None      Intermittent   X Continuous   X See RWP No. SS-KEH-038

HPT Coverage Required When: Project is initiated onsite

HPT Coverage Required Until: Project is completed onsite or until it is determined by H. P. survey that no further risk of contamination to personnel or equipment exists.

Authorized Health Physics Technicians: HPT Pool

---

**21. Personal Protective Equipment for Radiological Hazards**

X See RWP No. SS-KEH-038

---

**22. Radiation Dosimetry External**

X Basic TLD         HMP  
X Pencil         Finger Ring  
   PADI         Timekeeping  
   Other:

Known or Suspected Isotopes:  $^{90}\text{Sr}$ ,  $^{137}\text{Cs}$ ,  $^{60}\text{Co}$ ,  $^{99}\text{Tc}$ ,  $^{106}\text{Ru}$ ,  $^{238}\text{U}$ ,  $^{239/240}\text{Pu}$

Comments: The HPT may require additional dose measurement devices as required. See RWP No. SS-KEH-038 for additional requirements.

---

---

**HAZARDOUS WASTE OPERATIONS PERMIT**

**KAISER ENGINEERS  
HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

**Page 26 of 35**

---

---

**Rev. No. 0**

**23. Radiation Monitoring**

The following instruments shall be used to monitor the work environment for radiation.

<u>  </u> Micro R Meter	Cont.	15 min.	30 min.	hourly	other <u>          </u>
<u>X</u> Dose Rate Instrument	Cont.	15 min.	30 min.	hourly	<u>other see below</u>
<u>X</u> Alpha Detection Instrument	Cont.	15 min.	30 min.	hourly	<u>other see below</u>
<u>X</u> Beta Detection Instrument	Cont.	15 min.	30 min.	hourly	<u>other see below</u>
<u>  </u> Other	Cont.	15 min.	30 min.	hourly	other <u>          </u>

- Alpha and beta/gamma contamination surveys will be conducted periodically at the work site as well as whenever down hole equipment/samples/debris is removed from the borehole.
- A dose rate instrument will be used as needed to determine the intensity of radiation fields in the work area.
- Contamination control will be practiced at the borehole; The work area shall be maintained as free of loose contamination as is practical. If loose contamination in the general area exceeds 10,000 dpm/probe area work shall be suspended until loose contamination is brought under control.

**KAISER ENGINEERS  
HANFORD COMPANY**

Page 27 of 35

**24. Onsite Organization and Coordination:** To be completed on site.

Project Coordinator: \_\_\_\_\_

Project Engineer: \_\_\_\_\_

Field Team Leader(s): \_\_\_\_\_

Site Safety Officer: \_\_\_\_\_

Superintendent: \_\_\_\_\_

Designated Health Physics Technician: \_\_\_\_\_

Alternate Health Physics Technician: \_\_\_\_\_

FIELD TEAM

Name \_\_\_\_\_

### Job Function

[illegible]

**KAISER ENGINEERS  
HANFORD COMPANY**

Page 28 of 35

Rev. No. 0

As a minimum all employees and visitors must satisfy KEH and WHC "Hazardous Waste Worker" training requirements. These requirements fulfill guidelines set by 29 CFR 1910.120. Field documentation of hazardous waste training is mandatory for site entry. See the WHC Field Team Leader or the KEH SSO for "Safety Training and Personnel Requirements" forms.

Portable water supply available on work site? X Yes  
 — No

Portable toilets required on work site? X Yes If yes, how many? 2  
 — No

Temporary washing/shower facilities required at work site? X Yes If yes, describe below.  
 — No If no, state location of existing facilities.]

Description: Water for hand washing will be available for use. Pressurized emergency eye wash units will be available onsite.

Yes No  
X — On-site Communications Required? Emergency Channel KEH Health & Safety Emergency Channel J-44, J-10, or Emergency Cellular phone number 373-3800, WHC Emergency Channel Station 1, Transportation Frequency.

Nearest Telephone B-Plant (approximately 0.9 mile south) or cellular phone in vehicle or command trailer when available.

---

---

## HAZARDOUS WASTE OPERATIONS PERMIT

KAISER ENGINEERS  
HANFORD COMPANY

PROJECT 200-BP-1, 299-E33-38, -39, & -40

Page 29 of 35

---

---

Rev. No. 0

### Fire and Explosion

In the event of a fire or explosion, take immediate action if the situation can be readily controlled with available resources without jeopardizing the health and safety of site personnel and the public.

If the situation cannot be readily controlled:

1. Notify emergency personnel by calling 373-3800 (cellular) or 811 on plant phone.
2. If possible, isolate the fire to prevent spreading.
3. Evacuate the area.

### Chemical Exposure

Site workers must notify the Site Safety Officer immediately in the event of any injury or any of the signs or symptoms of overexposure to hazardous substances identified below:

<u>Substances Present</u>	<u>Symptoms of Acute Exposure</u>	<u>First Aid</u>
Cyanide compounds	Bitter burning taste, increased salivation, respiratory irritation, weakness, headache, confusion, nausea, vomiting, increased rate and depth of respiration	Get to fresh air, flush skin with water if applicable, get medical attention
Ammonia	Eye, nose, throat irritation, bronchospasm, chest pain	Get to fresh air, flush skin with water if applicable, get medical attention
Tributyl phosphate	Eye, respiratory, skin irritant, headache, nausea	Get to fresh air, wash skin with soap and water if applicable, get medical attention

---

HAZARDOUS WASTE OPERATIONS PERMIT  
KAISER ENGINEERS  
HANFORD COMPANY

PROJECT 200-BP-1, 299-E33-38, -39, & -40

Page 30 of 35

---

Rev. No. 0

Dibutyl phosphate

Respiratory irritant, headache; skin,  
eye, nose irritant

Get to fresh air,  
wash skin with soap  
and water if  
applicable, get medical  
attention

Petroleum distillate

Dizziness, drowsiness, headache,  
nausea, eye, nose, throat irritant,  
dry cracked skin

Get to fresh air,  
wash skin with  
soap and water if  
applicable, get medical  
attention

9112520113



**KAISER ENGINEERS  
HANFORD COMPANY**

Page 31 of 35

**NOTE: AT LEAST ONE PERSON CURRENT IN FIRST AID/CPR MUST BE ON SITE DURING OPERATIONS.**

---

**HAZARDOUS WASTE OPERATIONS PERMIT**  
**KAISER ENGINEERS**  
**HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

**Page 32 of 35**

---

**Rev. No. 0**

**Emergency Response Authority**

D.A. Lamar, and J. A. Bultena (FTL) or J. M. Jiminez (FTL) [drilling], or D. C. Weekes (FTL) [well completion] are the designated Site Emergency Coordinators and have final authority for first response to on-site emergency situations.

Upon arrival of the appropriate emergency response personnel, the Site Emergency Coordinator shall defer all authority but shall remain on the scene if necessary to provide any and all possible assistance. At the earliest opportunity, the Site Safety Officer or the Site Emergency Coordinator shall contact the WHC Project Coordinator or Health and Safety Officer.

Project Coordinator M.A. Buckmaster Phone (w) 376-1792 (h) \_\_\_\_\_

Health and Safety S. Coleman Phone (w) 376-4117 (h) \_\_\_\_\_  
Officer

Health Physics S. K. DeMers Phone (w) 373-3031 (h) \_\_\_\_\_

KEH Site Safety Officer Supervisor  
S. R. Turney Phone (w) 373-4791 (h) \_\_\_\_\_

WHC Industrial Safety H. N. Bowers Phone (w) 373-3943 (h) \_\_\_\_\_

Note:

**KAISER ENGINEERS  
HANFORD COMPANY**

Page 33 of 35

Rev. No. 0

The following personnel were present at pre-job safety briefing conducted at \_\_\_\_\_  
(time) on \_\_\_\_\_ (date) at \_\_\_\_\_ (location),  
and have read the above plan and are familiar with its provisions:

**Signature**

[illegible]

---

---

**HAZARDOUS WASTE OPERATIONS PERMIT**

**KAISER ENGINEERS  
HANFORD COMPANY**

**PROJECT 200-BP-1, 299-E33-38, -39, & -40**

**Page 34 of 35**

---

---

**Rev. No. 0**

The following items will be checked and verified where applicable prior to start of work:

Yes N/A

Fully charged ABC Class fire extinguisher available on site?	—	—
Fully stocked First Aid Kit available on site?	—	—
All project personnel advised of location of nearest phone?	—	—
All project personnel advised of location of designated medical facility or facilities?	—	—
Decontamination Trailer on site?	—	—
ALL PPE on site?	—	—
Bottle cart and breathing air on site?	—	—
Hazardous Waste Operating Permit covered in pre-job safety meeting?	—	—
Emergency personnel notified of field activities?	—	—
Emergency SCBA Units (2)	—	—

\_\_\_\_\_  
Printed Name of Field Team Leader or Site Safety  
Officer

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

HAZARDOUS WASTE OPERATIONS PERMIT  
KAISER ENGINEERS  
HANFORD COMPANY

PROJECT 200-BP-1, 299-E33-38, -39, & -40  
Page 35 of 35

Rev. No. 0

29. Field Procedures Change Authorization

Instruction Number  
to be changed

Duration of Authorization Requested  
☐ Today only  
☐ Duration of Task

Date: \_\_\_\_\_

Description of Procedures Modification:

Justification:

Person Requesting Change:

Verbal Authorization Received From:

Name

Name

Time

Title

Title

Signature

Approved By

(Signature of person named above to obtained  
48 hours of verbal authorization)

Westinghouse Hanford Company  
RADIATION WORK PERMIT

No. SS-KEH-038

Rev. No. 0

☒ Long-Term ☐ Temporary ☐ Special

Valid From: 10/10/90 To: 10/10/91

Page 1 of 2

Requested By: Env. Projects

Location: 200-E (200-BP-1)

Authorized Work Scope: Drill Sampling Wells adjacent to deactivated cribs.

RADIOLOGICAL CONDITIONS

Contamination Potentials:

Dose Equivalent Rates Expected Average/Maximum:

☒ Alpha ☒ Beta/Gamma

☒ Beta ☒ Gamma ☐ Neutron

Smearable: < 1,000,000 dpm / probe area Beta/Gamma

< 1,000 dpm / probe area Alpha

Whole Body: < .5 mrem/hr. Avg. / < 250 mrem/hr

Max.

Fixed: Same

Extremity: Same

Comments: Due to proximity of wells to deactivated cribs all drilling spoils and purge water should be considered to be cont. until lab analysis is complete. Comments: Hand exposure to contaminated down hole equipment/samples of most concern.

DOSIMETRY			PROTECTIVE EQUIPMENT				
EXTERNAL	INTERNAL	RESPIRATORY	BODY	HAND	HEAD	FEET	
Basic TLD	Isotope:	Full-Face	Lab Coat	X Canvas	X Cap		Shoe Covers
X HMPD	MFP	PAPR	X Coveralls:1	X Surgeons:	X Hood	X	Canvas Boots
X Pencil	MAP	Supplied	Gortex	X Waterproof	X Face Shield	X	Rubbers
Finger Ring	Chest Count	Air	X Waterproof	X Leather	X Waterproof	X	Rubber Boots
PADI	X WB Count	SCBA	No Personal	X ITEM #5	X ITEM #4	X	ITEM #4
Time Keeping	X Urinalysis	X ITEM #3	Outers				

RADIATION PROTECTION TECHNOLOGIST COVERAGE

☐ Intermittent ☐ Continuous ☒ See Special Instruction No.: 6

RPT Coverage Required When: See item 6

RPT Coverage Required Until: See item 6

Phone No.: 3-3031

SPECIAL INSTRUCTIONS

1. Comply with all General Requirements and Practices as stated in WHC-CH-4-15, unless specifically changed by this Radiation Work Permit (RWP).

(Continued)

Prepared By: [Signature] Date: 10/12/90 Maintenance: [Signature] Date:

H. P.: [Signature] Date: 10/12/90 Operations: [Signature] Date: 10/15/90

[Signature] Date: 10/24/90 Date:

KEH: [Signature] Date:  KEH: [Signature] Date: 10/16/90

FIELD CHANGE

Date:  H.P.:  Operations:

WESTINGHOUSE HANFORD COMPANY  
RADIATION WORK PERMIT  
Special Instruction Continuation Page

No.: SS-KEH-038

Rev. No.: 0

Page: 2 of 2

☒ Long Term ☐ Temporary ☐ Special

2. If hand exposure becomes disproportionate to body exposure HPT will suspend handling of down hole equipment/samples until finger ring dosimeters are issued to appropriate personnel. Pencil dosimeter required if general area dose rates exceed > 2 mrem/hr.
3. Respiratory protection will be as per HPT in conjunction with SSO/HWOP.
4. Waterproof outer PPE required for work that could reasonably be expected to result in contact with, or splash by, contaminated liquids.
5. Leather work gloves may be substituted for canvas outer gloves if required for industrial safety purposes.
6. Continuous HPT support is required for all wells being drilled. HP Supervisor may vary the level of direct HPT support on a "Well by Well" basis depending on the probability of radioactivity being encountered; this will be a function of well location, depth and sample / cutting activity to date.

Attach to RWP

## ALARA MANAGEMENT WORKSHEET (AMW)

## PART I PRE-JOB INFORMATION

RWP No <u>SS KCH 03R</u>	Work Pkg No or Equivalent	Area/Facility/Location <u>200E 200BP-1 BxBy Crib</u>
Job Title/Description <u>GROUND MONITORING Wells inside BxBy Crib</u>		ALARA Review Required <input type="checkbox"/> Yes If yes, then complete Section II of this form <input checked="" type="checkbox"/> No If no, then sign in Section III of this form

## PART II ALARA REVIEW

PART IIA ESTIMATED COLLECTIVE DOSE < 0.1 Person-rem

## PART IIB PROTECTIVE MEASURES

	YES	NO	REFERENCE/EXPLANATION
A Can work be moved to a lower exposure rate area?		<input checked="" type="checkbox"/>	
B Can time-saving techniques be employed to reduce dose?		<input checked="" type="checkbox"/>	First attempt at these type of wells
C Can decontamination be done to reduce risks?	<input checked="" type="checkbox"/>		Dirt cover of CONT AROUND WORK AREA
D Can additional shielding be employed to reduce dose rates?		<input checked="" type="checkbox"/>	
E Can additional nonradiological hazards be identified and planned for?	<input checked="" type="checkbox"/>		Site Safety PLAN identifies
F Can other contingencies (e.g., off-normal events, accidents, etc.) be planned for?		<input checked="" type="checkbox"/>	
G Can the number of personnel entering the radiologically controlled area be reduced?		<input checked="" type="checkbox"/>	
H Can other adverse work conditions (e.g., heat stress, noise, physical restrictions, etc.) be planned for?	<input checked="" type="checkbox"/>		Site Safety plan covers
I Can special ventilation systems be used in lieu of respiratory protection?		<input checked="" type="checkbox"/>	
J Can additional special tools or equipment be utilized to reduce exposures?		<input checked="" type="checkbox"/>	
K Can additional provisions for waste removal, segregation, or minimization be accomplished?		<input checked="" type="checkbox"/>	
L Can additional efforts be made to reduce FUTURE doses?		<input checked="" type="checkbox"/>	
M Describe any other methods which were used to reduce exposures or risks			

PART IIC ESTIMATED COLLECTIVE DOSE (corrected) 0.020 Person-rem

## PART III PRE-JOB APPROVAL

Signature of AMW preparer

Date 10/17/90

DISTRIBUTION:

Original - RWP

Work Package

ALARA Program Office

ALARA Team Chair

## PART IV LESSONS LEARNED

In the course of performing any job covered by this AMW, document any lessons learned and send copy to ALARA Team Chairperson or Point of Contact. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_